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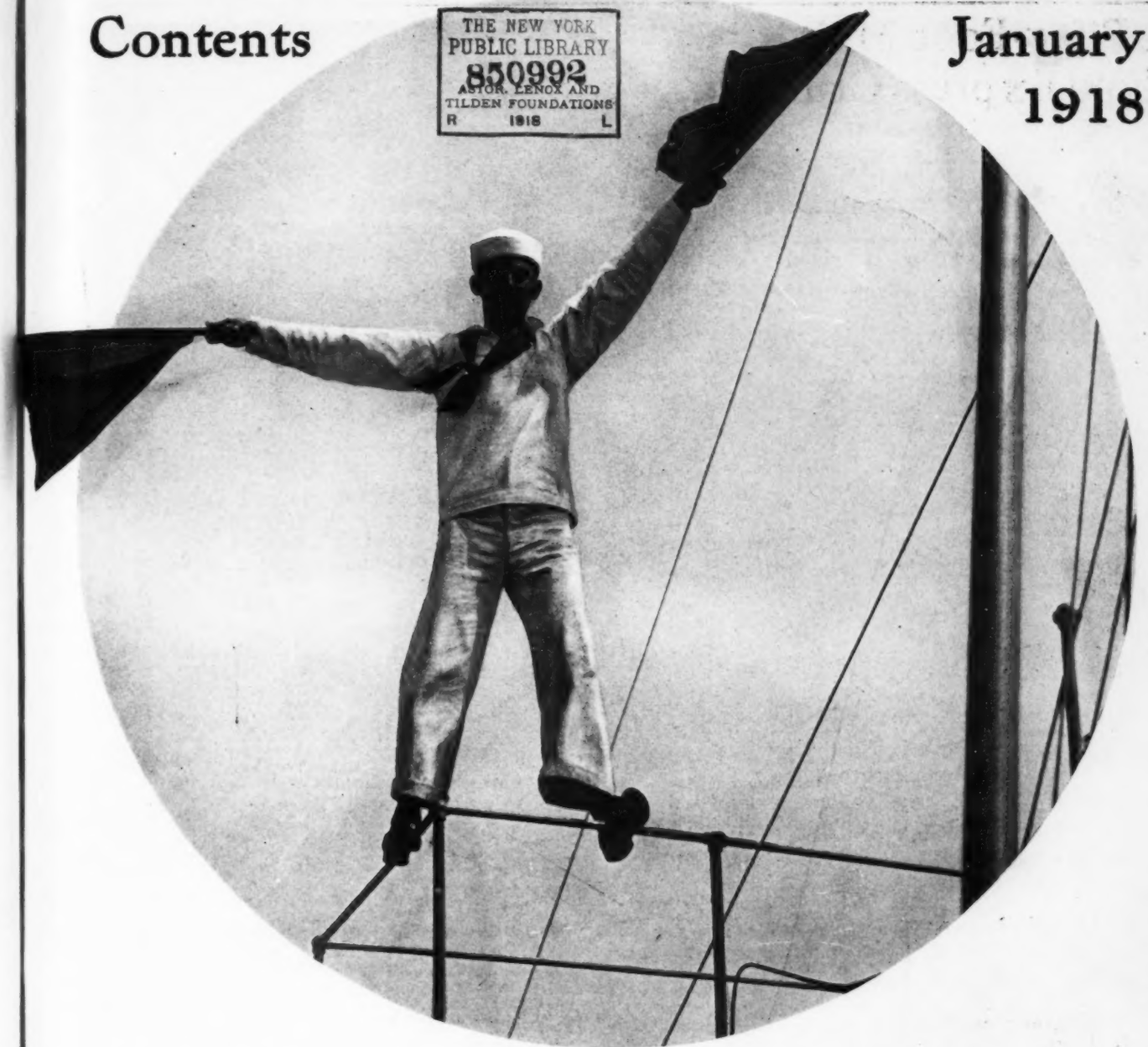

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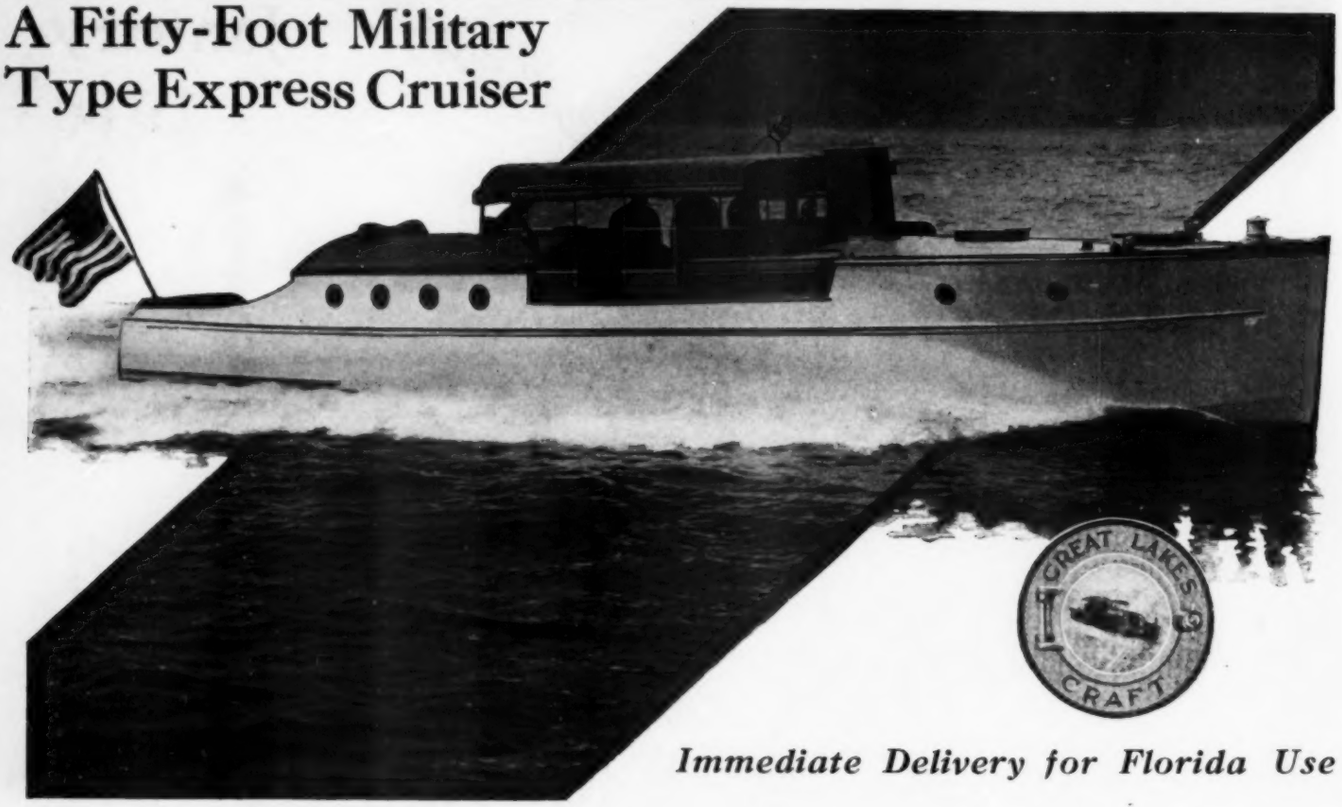

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Just TWO boats ready *now* for immediate shipment. All orders filled strictly on priority of receipt. Write now for Booklet No. 111, describing this boat in detail.

GREAT LAKES BOATBUILDING CORPORATION

MILWAUKEE, WISCONSIN

Co-Operation—Why Not?

The Kind of Spirit Which is Needed Among the Manufacturers and Builders to Put the Industry On the Top Where it Belongs

THE universal question—it has been asked many thousands of times. You, Mr. Boat Builder—Naval Architect and Engine Builder—do you know why the motor boat industry has not advanced by leaps and bounds like its competitive sports and industries? Do you know that motor boating, the grandest and most exhilarating of all sports has been kept in the background and has not come into its own?

The motor boat industry is about twenty-four years old to-day. It has crept along slowly and steadily, but what is it when you make a comparison between the motor boat industry and its younger brother the Automobile industry? Many of you no doubt wonder how the automobile industry could possibly have made such strides. There is only one answer—CO-OPERATION between the different manufacturers and concentrated efforts of all the manufacturers with but one point in mind and that is, to make the automobiling the one crowning sport.

When we stop and look back over the last twenty-four years, we oftimes wonder how the motor boat industry has even grown to its present size, especially when we take into consideration some of the policies which have been followed by the so-called corner stone in the industry, but the old saying must be true—that "some things succeed in spite of themselves."

If the motor boat industry is to grow to any great magnitude, we must start right in and inject some pep and aggressiveness into it. The manufacturers of boats and engines must all get together with a real National Association, one in which co-operation and concentrated effort is the foremost thought. One thing is sure that we cannot attain the end by drifting carelessly along with the tide. We must awaken the general public to the fact that there is no other sport in the world which compares with motor boating, and to do this, we will be compelled to have the co-operation and concentrated effort of every manufacturer in the game. We must also get the co-operation of all the leading newspapers and magazines and in fact to a certain extent do national advertising.

The writer had the pleasure of attending a meeting of our Association which was called specifically to discuss national Advertising and, to say the least, was greatly surprised at the stand taken by some of the oldest and best known of our manufacturers, for instance, one of the oldest manufacturers in the Motor Boat Industry made this statement, that "he had been in business for twenty-five years and had never been compelled to do national advertising to keep his factory full of work." This same stand was taken by several of the officials of the National Association of Boat and Engine Manufacturers.

You do not need volumes of statistics to prove that arvertising pays, nor do you need corps of certified public accountants to prove to you that the younger generation of boat and engine manufacturers who believe in advertising and publicity are making money and not only making money, but are "doing more than their bit" to build up the interest in motor boating. Therefore it is absolutely essential that there must be a change in the personnel of the National Association of Boat and Engine Manufacturers if we ever expect to put the motor boat industry well up in the lead. We must get people at the head of this Association who are aggressive and who are willing to take off their coats and work diligently and earnestly for the industry as a whole.

It is very amusing to draw a comparison between the National Association of Boat and Engine Manufacturers which is the official society of the boat and engine manufacturers and the Society of Automotive Engineers which we might say is the official society of the automobile industry and to say that there is a wide difference would be putting it mild.

Each and every member of the Society of Automotive Engineers is putting forth his best efforts not only to help along

(*Continued on page 60*)

Naval Birdmen in

WOULD you know how Uncle Sam's eagles of the sea, the ten thousand naval aviators who must drive the German vulture to its lair, are created? How young men who last spring were assembled at a dozen colleges from every part of the country, and who then flocked to the coast because it seemed that in the Naval Coast Defense Reserve would be found the merriest fighting, are accepted and trained to become birdmen in the Naval Reserve Flying Corps? Then read. If I lapse into an occasional inelegance of expression, pass it up, for I know the subject only from the inside and must give you the hot dope.

In Navy parlance your eyes must be "Twenty - twenty," which means normal, teeth good, hearing and inner ears excellent, heart and lungs above reproach—light weight and college education, either complete or partial, helps some, — but, when it comes to PERSONALITY, you've got to have a whole lot if you would attain the rank of Ensign in the Flying Corps

A young man, clad in the clothes the Lord gave him, placed his hands on the butt end of an abbreviated golf stick (it might as well have been a short cane) bent down, and walked rapidly ten times around a narrow circle Then he stood erect, staggered slightly, recovered his poise, and, walking through a narrow doorway, picked up a small object from the floor and handed it to a doctor whose uniform proclaimed him to be a lieutenant of the Navy.

The young man was a Reservist, trying for transfer to the Naval Reserve Flying Corps, and just completing one of the most difficult of the tests for determining his sense of equilibrium.

"You'll get by," said the doctor, who had enjoyed the test to the utmost, "but you ought to have seen the last man through. He took two chairs and a table with him on his way to the floor."

He added that two men out of five who take the "golf stick test" either lurch violently in any direction but the doorway or reach the floor after a variety of graceful postures, and if you don't believe him, kind reader, try it yourself. When I first attempted it I bent an arm and broke my glasses, and was mighty thankful that the casualties weren't the other way around.

A great many young men from Class 4 of the United States Naval Reserve Force have transferred to the Flying Corps, or Class 4 for 5, as it is technically known, and are now in training or awaiting training at the Navy's ground school. Comparatively few of the embryonic aviators have yet taken to wings, but if the war lasts long enough all those who are now in service and thousands more will be given their chance to sail a flying boat up out of the water and show the enemy that the bird nephews of Uncle Sam know the principles of flight plus fight.

The requirements of acceptance into this vastly important branch of the naval service are strict, both physically and mentally. The test just described is used at least at one of the enrolling offices of the Naval Reserve, and is preceded by such little tricks as hopping on one foot around a large circle, forward and backward with eyes open and closed, standing blindfolded for a minute and a half with the bare sole of one foot resting precariously on the knee of the other leg, and other tests for getting a line on the applicant's sense of balance—not to mention divers others for ascertaining the suppleness of his joints.

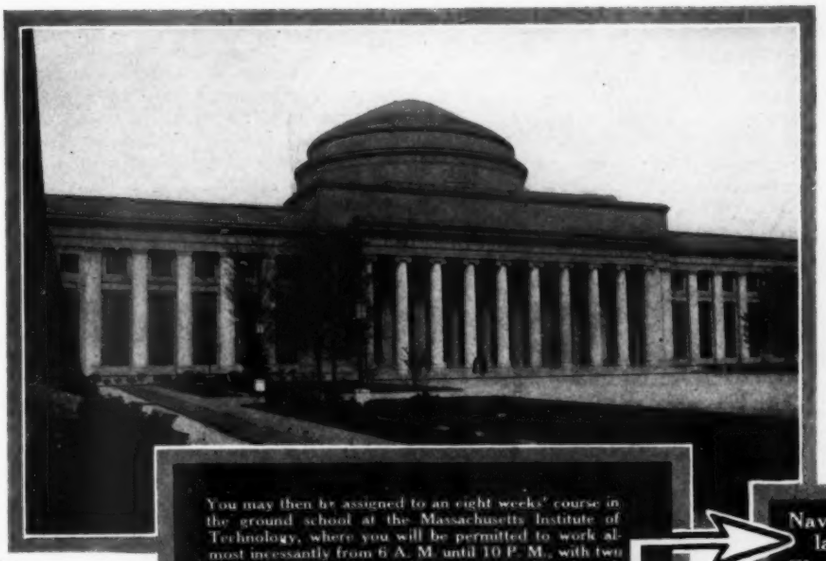
Eyes must be normal, or, in the Navy parlance, "twenty-twenty." That is to say, with a distance of twenty feet as a standard for reading type of a certain size, the aspiring airman must prove his ability to read that type

After going through various stunts so that they can test your sense of balance—the examiner will ask you if you can swim, play tennis, base ball, football, and ride a horse; he will naively inquire as to your knowledge of calculus, plane and spherical trigonometry — motor cars—how you like the present state of the weather, mountain climbing and beans three times a week. After

the Making By Fifteen Twenty

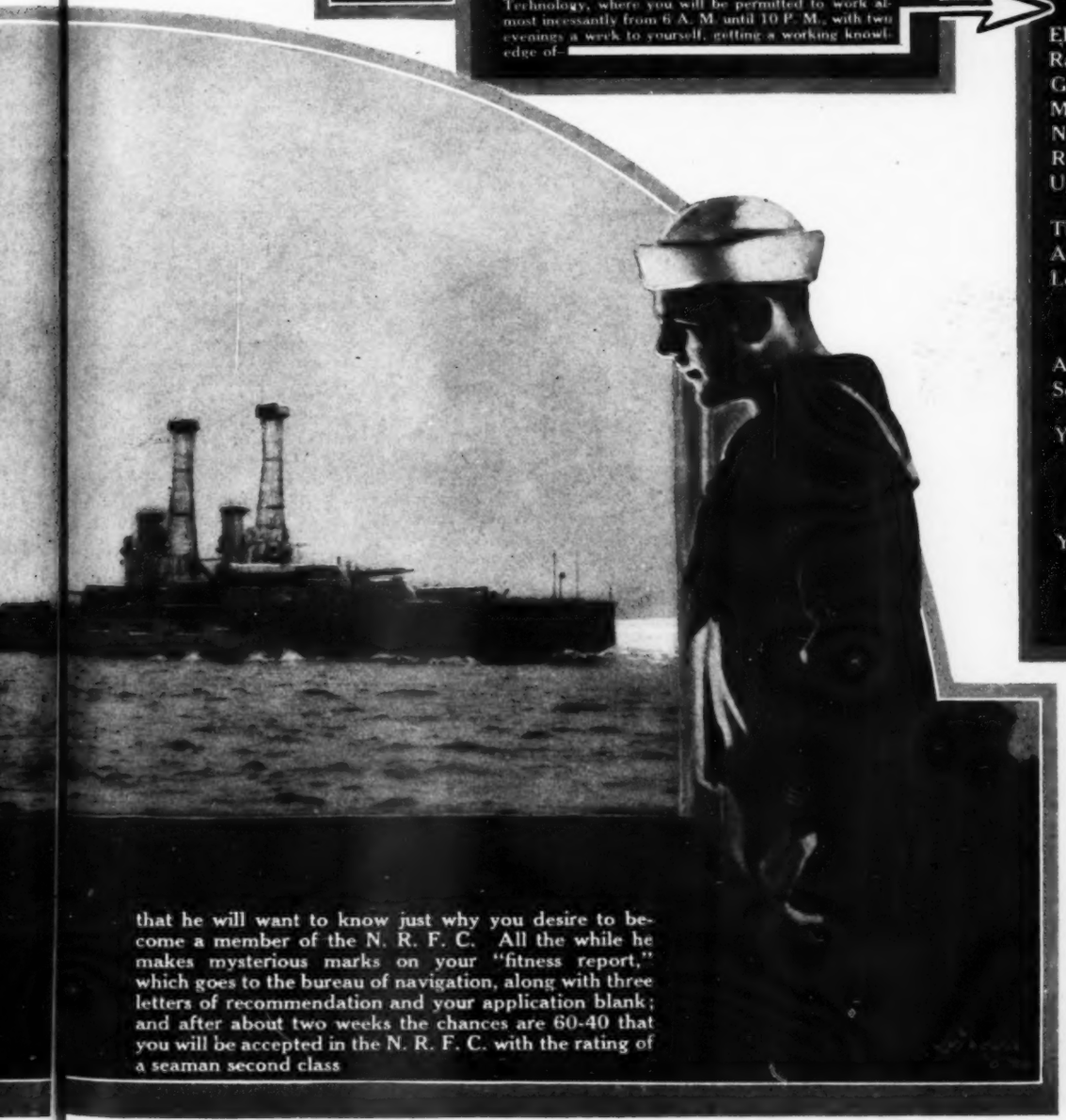
at nothing less than twenty feet with either eye. If either is subnormal—say seventeen-twenty—he is not first-rate material for the air service, even though he be a Hercules in strength and of a weight ten pounds less than the average—for be it also noted that lightness within reasonable limits is highly desirable. Teeth good, hearing and condition of the inner ear excellent, heart and lungs above reproach—so much for the other physical requirements; most of the young college men who went into the Reserve in the early days of spring and have since wished to transfer to aviation can satisfy them.

In the mental examination a college education, complete or partial, stands the applicant in good stead, because a knowledge of mathematics through trigonometry is practically essential. But there are other things—personality, for instance, and manner, and eagerness. Personality is an elusive thing and hard to describe, but one must have it in good measure if he would attain to the rank of ensign in the Flying Corps.



You may then be assigned to an eight weeks' course in the ground school at the Massachusetts Institute of Technology, where you will be permitted to work almost incessantly from 6 A. M. until 10 P. M., with two evenings a week to yourself, getting a working knowledge of—

- Navy customs and regulations.
- Electricity.
- Radio.
- Gunnery.
- Meteorology.
- Navigation.
- Rigging and structure.
- Upkeep and repair of air craft.
- Theory of flight.
- Air craft instruments.
- Lectures and practical work on allied and enemy airplane motors.
- Aerial photography.
- Seamanship and the semaphore code.
- You are watched from the time you enter "Flight D" until you graduate from "Flight A."
- You have the best instructors, academic and military, that there are in the country.



that he will want to know just why you desire to become a member of the N. R. F. C. All the while he makes mysterious marks on your "fitness report," which goes to the bureau of navigation, along with three letters of recommendation and your application blank; and after about two weeks the chances are 60-40 that you will be accepted in the N. R. F. C. with the rating of a seaman second class

The candidate, now fully clothed, and with his black silk neckerchief smoothed down and tied "sea-going," enters the enrolling office and stands at attention before the dignitary whose business it is to select officer material from the dozens of

seamen who pass through his hands. This particular seaman is nervous, but he does not purpose to let anyone give him the raz, and he stands chin up, hands by his sides, and allows his eagerness to emanate from him like an aura. Not for him the carefree, nonchalant attitude of the civilian, both hands on the desk and one heel occasionally kicking up behind, for he has been an enlisted man in a branch of the Navy for six months and knows that for such things as this does the enlisted man remain one.

"Why do want to go into aviation?" The enrolling officer leans back in his chair and settles himself as comfortably as his erect back will let him, trying perhaps by force of example to trick the candidate into unseemly slouchiness.

"Because I want to see some action before this war is over." This is the invariable answer, it is generally the truth. Strictly between ourselves, however, there is an occasional aspirant to the air service who has been captivated by the uniform of a flight ensign and has visualized a person strangely resembling himself strolling down Main Street in Navy khaki. Let action take care of itself—he knows that gold braid will go big on the small-time circuit.

"Quite so. How much math have you had?"

"Arithmetic, algebra, plane and solid geometry, plane and spherical trig, calculus—" It is evident that this applicant knows the ropes, and it is taken for granted that he knows how to speak the truth.

There is a little further questioning about mathematics, however, and then the examiner breaks in with, "Ever ride horseback?"

"Er—no, sir." It is a strong temptation to say yes, for how should one who has only seen aeroplanes from a distance know but that a firm seat in the saddle will help a man to fly?

"Swim?" "Yes, sir." "Play baseball, tennis, football?" "Yes, sir." Always, the sir, you will notice, for the applicant knows that his manner and bearing are quite as much under surveillance as his athletic prowess.

"Very well; what do you know about motors?"

Right here is where the average candidate shines with a glowing effulgence. He has picked cars to pieces on his father's country estate, and smashed them up when rounding a corner at sixty per, and there is little about the intimate anatomy of a gasoline engine that he doesn't know by sight, touch, or taste.

The examiner, satisfied on this important point, digresses to mountain climbing, the state of the weather, life in the Navy, beans for breakfast on Sundays and Wednesdays, the war situation, always with the intent of prying into the applicant's mind, getting his viewpoint. And continually he makes mysterious marks on a blank form—filling out the "fitness report" which has such a vital effect on one's chances of acceptance, and which is kept sacred to the eyes of officers and saintly yeomen.

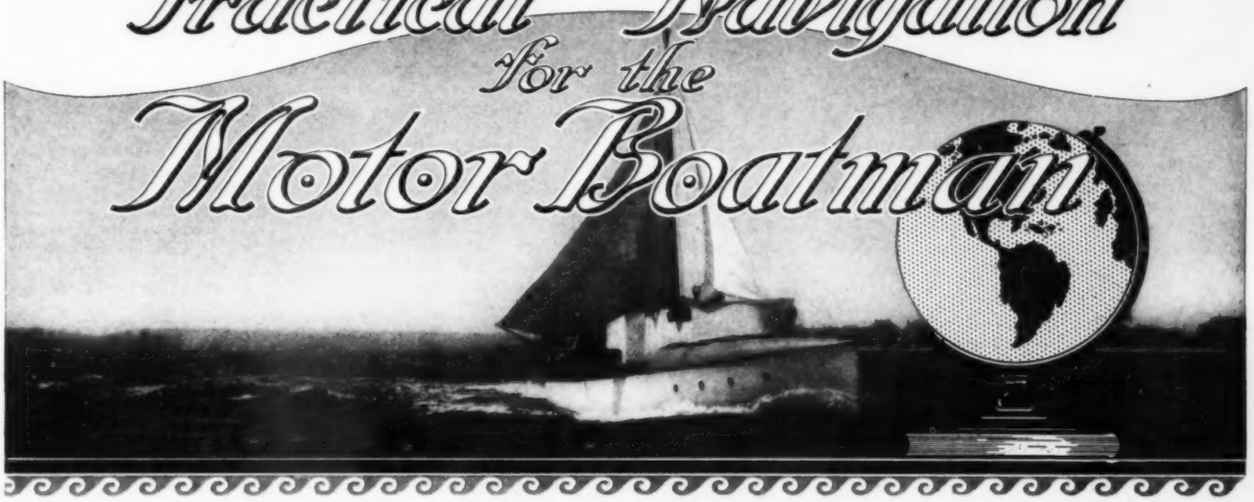
At length the candidate is dismissed and told to fill out his application blank, which, since it is the Navy, is not one blank but four (the ultimate disposition of the extra copies being known only to the inner circle). With the application he must file three letters of recommendation, and if these letters have been written well, and by persons kindly disposed toward him he must have an aviator's heart and better to withstand the shock of learning the inward excellence of his character.

Not a very stringent examination, you will say? Perhaps; but not all has been told, and it is well not to forget that this man comes to the enrolling office with a letter of approval from his commanding officer, or that the record of his service in the Reserve is an open book to the examining offi-

(*Continued on page* 58)

Having shown your sense of EQUILIBRIUM—"Proved up" on your PERSONALITY, you will now be sent to Pensacola or another of the naval flying bases for a three months' course in elementary flying with the reward of a commission as Flight Ensign. You are now one of Uncle Sam's "Eagles of the Sea"

Practical Navigation for the Motor Boatman



Course and Distance to a Fixed Point
Use of a Deviation Card
Graphical Methods
Napier Diagram

By W. Mack Angas

IN SEVEN PARTS—PART III

To Determine the Compass and Magnetic Courses
Finding Great Circle Courses
Use of Logarithms
Mercator Sailing

THUS far the usual methods of working dead reckoning have been explained and after some practice the student should be able to get the location of a vessel by these methods without making mistakes in the mathematical work of making the computation. The student should practice at the work until this state of proficiency is reached, always remembering that a position by dead reckoning is not necessarily the real position of the vessel, because there are so often unavoidable inaccuracies in the data used in making the computation. Having located the vessel by dead reckoning or by some other means, the navigator naturally wishes to know what the course and distance to his desired destination is. The finding of the course and distance from one fixed point to another will therefore be the next subject taken up here, and as before, a graphical method will first be described.

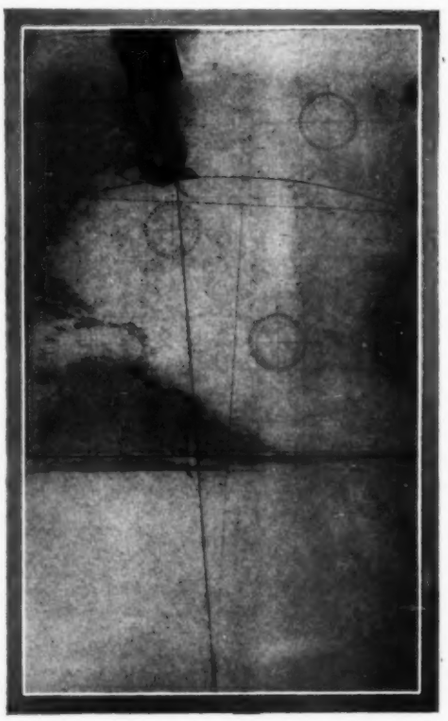
The method of finding the course and distance from the position of a vessel to some other fixed point, which will be called the destination, is almost too obvious to need any description here. It is only necessary to plot the vessel's position on the chart and then measure the distance to the destination with the dividers and get the course either with the parallel rulers or the course protractor. If the chart is a polyconic projection the distance can best be measured by setting the dividers for some convenient distance on the scale of miles and then "stepping off" the line connecting the position and destination with the dividers thus set. If a Mercator chart is used, and this will be the kind of chart generally used in off-shore or coastwise work, the graduated edge of the chart lying due East or West of the middle latitude of the course will have to be used as a scale of miles as was explained in last month's article. If the course is a long one it will be best to break it up into lengths of a couple of hundred miles or so and measure each section on its own middle latitude as was shown also last month. Getting the "course" or direction to the destination is even simpler than getting the distance. To do this with the parallel rulers one must lay the rulers on the chart with the ruling edge running through both the position of the vessel and the destination and then transfer this direction to the nearest compass rose by moving the rulers across the chart, first one arm and then the other, taking great care that the arm which is being held stationary does not slip, until the ruling edge passes through the center of the rose. The true course may now be read from the outer rose, and if there is an inner magnetic rose the magnetic course may be read from this in mariner's points. The various patent course protractors which take the place of the parallel rulers work in a variety of ways, but the instruments are always accompanied with adequate instructions so their use will not be described here.

The great circle. A cord stretched across a globe from New York to the Straits of Gibraltar takes the position shown. This illustrates the fact that the great circle course really does lie far to the North of the rhumb line

The navigator having obtained the true or the magnetic course to his destination will wish to know what his compass course will be. To get the compass course the compass errors will have to be applied to the *true* courses obtained from the chart by the second rule given in the first article of this series, that is, westerly errors must be applied to the *right* or clockwise and easterly errors to the *left* or counter-clockwise. This rule is the exact reverse of the one for getting true courses from compass courses, and the reason for the reversal of the rule should be studied out by the student with the aid of Figure 3 in the November article and the text that accompanies that figure. In getting a compass course from a true course it will be found most convenient to get first of all the magnetic course by applying the variation, then with this magnetic course some idea can be obtained of what the deviation will be and the real compass course can be arrived at by trial. The deviation varies with the compass course of the vessel and so only by trial can a compass course be arrived at that will yield the desired magnetic course when the deviation is applied. Problem 1 illustrates this decidedly awkward procedure, though in justice to the method it must be admitted that the awkwardness is more apparent than real unless the deviations are

large. In Practical Motor Boat Handling a form of deviation card is illustrated on page 66 which obviates all this difficulty, and on large vessels where it is desirable to treat the deviations due to different causes separately, a device called the Napier Diagram does the same thing. The Napier Diagram is described fully in Bowditch, but the beginner is not advised to go into the manner of making it just yet. For the use of the motor boatman the form of card shown in Practical Motor Boat Handling is really better. Naturally in getting compass courses from magnetic courses westerly deviations must be applied to the right or clockwise and easterly ones to the left or counterclockwise.

The course that will be obtained by the methods described above will be the course from the position of the vessel to the destination along the rhumb line, but it will not be the shortest route. For comparatively short courses, for courses which run nearly north and south, and for courses in the tropics, the rhumb line and so-called "great circle course" are to all intents and purposes identical, but where long courses run east and west in high latitudes the "great circle courses" differ from the courses along the rhumb line and are much shorter. The great circle course gets its name from the geometrical fact that the shortest path between two points on a sphere's surface is the great circle cut from the sphere by a plane passed through the two points and the center of the sphere. The truth of this statement will not be proved mathematically here, but one of the accompanying photographs is a good practical proof of the proposition as it shows a string stretched tightly across the surface of a globe from New York to the Straits of Gibraltar and it is easy to see how far north this great circle course goes. The reader must not jump to the conclusion that great circle courses are always followed on long voyages because they save time. There are other factors such as ocean currents, prevailing winds, and the chances of getting good weather to be considered, and in the days of the "Yankee Clipper Ships" it was the wonderful knowledge of such factors possessed by our ship masters that enabled them to "put it over" all rivals so handily. The modern navigator does not have to remember all about these ocean currents, winds, and so forth. Our Hydrographic Office issues periodically "Pilot Charts" of the important oceans which indicate the courses that the government experts advise different classes of ships to take in going from one place to another. Routes for sailing vessels, low powered steamers, and high powered steamers are shown and these routes take into consideration all such factors as winds, currents and the prevalence of ice and fog. The routes are curved as a hasty examination of a pilot chart will show, and in practice the curved routes are broken up into short convenient straight runs which are plotted on the regular chart of the vessel as she proceeds. It is interesting to examine one of these charts and see how far out of the shortest route between two places sailing vessels go in order to take advantage of the "trades" as the steady prevailing winds of the low latitudes are called.



Professor Airy's method of laying off the great circle. The great circle course from Sandy Hook to Cape St. Vincent is being drawn. The rhumb line between the points was first drawn and then the perpendicular bisector of the line was put in. The middle latitude of the rhumb line was looked up in the table on page 82 of Bowditch and the "corresponding parallel" obtained. As this parallel fell off the limits of the chart a sheet of paper was attached to the lower edge of the chart and the desired parallel drawn on this. The great circle is drawn with pencil and a string tied to a thumb tack located at the intersection of the perpendicular bisector and corresponding parallel

In spite of these most useful Pilot Charts the modern navigator occasionally wishes to lay off a great circle course for himself and there are two easy and practical methods of doing this. The first method is to make use of a great circle chart or "Gnomonic Projection," if one is at hand, and the second method is to lay off the Great Circle on the Mercator Chart in the way invented and described by Professor Airy. The great circle chart is a chart so constructed that any straight line on the chart is a great circle. The method of projection used in making the chart is to project the features of the globe out from its center to a plane tangent to the globe at one point only. The chart is badly distorted and is of no use except in finding great circle courses. This is done by drawing a straight line from the ship's position to the destination and noting where this line cuts the various parallels of latitude and meridians of longitude. These various positions where the great circle cuts the meridians and parallels are then pricked off on the Mercator chart and connected by a series of short straight lines. The resulting broken line approximates the great circle course. The method of Professor Airy requires no other equipment than a Mercator chart, drawing instruments, and Bowditch. First of all the position and destination are connected by a rhumb line, and a line is drawn through the exact center of this rhumb line at right angles to it. The middle latitude of the rhumb line is then looked up in the small table at the foot of page 82 in Bowditch and from this table a certain parallel of latitude is obtained. The intersection of this parallel of latitude with the perpendicular bisector of the rhumb line is the center of an arc which passes through the position of the vessel and the destination and which approximates the true great circle very closely. The whole business of laying off the great circle by Airy's method is illustrated by a photograph. In most cases the parallel of latitude which is obtained from the table on page 82 of Bowditch will not be found on the chart upon which the rhumb line is drawn because it will be in the other hemisphere from that of the chart; when this occurs a large sheet of paper must be fastened to the chart with thumb tacks and the required parallel drawn on this paper. This is illustrated in the photograph of Professor Airy's method.

In general, graphical methods of finding the course and distance to a destination are in far greater favor than graphical methods of working dead reckoning. In fact the graphical method of finding a course and distance to a destination is in most cases more convenient than the method by computation, but because the method by computation does not require the chart it is sometimes useful and one might say necessary. Where long courses have to be handled and the measurement of the course on the chart would be laborious, the method by computation is both more convenient and more accurate than measurement on the chart.

The first method of computing the course and distance between two locations is an application of middle latitude sailing and it is called finding the course and distance by middle latitudes. The computation is exceedingly simple. First of all the difference of latitude is found by subtracting the lesser of the two latitudes from the greater; the difference of latitude thus obtained will be either in minutes or degrees and minutes, for it is not worth while carrying out the latitudes and longitudes of the positions to seconds unless unusually precise results are desired for some special purpose other than that of ordinary navigation. The difference of latitude is converted into minutes by multiplying the degrees by 60 and adding the number of minutes thus obtained to the minutes that were obtained by direct subtraction. The middle latitude to the nearest degree is obtained by adding the latitudes of the position and destination together and dividing the sum by two. The difference of longitude is obtained by subtracting the longitudes just as the latitudes were subtracted and the resulting difference of longitude is converted to minutes as above. The difference of latitude in minutes is equal to the number of miles of northing or southing that will have to be made good in going from position to destination because the minute of latitude is always equal to the nautical mile. By turning the difference of longitude in minutes to miles of departure both the "difference of latitude" and "departure" of the course between the two positions will be known and the corresponding course and distance may be looked up in Table 2 in the same way that the "course and distance made good" was looked up when traverses were worked last month. The difference of longitude is converted to miles of departure by looking up the middle latitude as a course in Table 2, finding the difference of longitude in minutes in the distance column and taking the departure from the "lat." column. If the statement made in last month's article is remembered that in working the middle latitude method the "courses" at the tops and bottoms of the pages in Table 2 are middle latitudes to the nearest degree, the distance columns are columns of differences of longitude in minutes and the "lat." columns are columns of departures in nautical miles, little trouble will be had in mastering the method. As was said before the actual course and distance is found by looking for a place in Table 2 where the difference of latitude occurs alongside the departure found by the middle latitude method, the distance is then taken from the distance column and the course taken from the top or bottom of the page, according to whether the difference of latitude or the departure is the greater. Problem 2 illustrates this procedure fully and should be carefully gone over and checked up by the student who should look up all the values in the Bowditch tables and find them there for himself.

The middle latitude method works well in low latitudes and with short courses, but does not give accurate results in high latitudes or with long courses. The method fails to give accurate results where the equator is crossed and should not be used for such courses. In cases where the values of the difference of latitude or longitude are too great to be found in Table 2, the values may all be divided by some convenient number and the problem worked with these reduced values. To get the real distance the distance obtained by working with the reduced values must be multiplied by the same number that the original differences were divided by. Problems 3 and 4 illustrate this procedure and also show how the difference of longitude is obtained when the meridian of Greenwich or the 180 meridian is crossed.

Where greater precision than can be obtained by middle latitudes

Marking a ship's position on the chart. There is a right way to do this and a number of make-shift and more or less clumsy ways. The best method is shown above. The latitude is carried from the edge of the chart with parallel rulers and the longitude laid off with dividers which have been suitably set on the longitude scale on the top or bottom of the chart

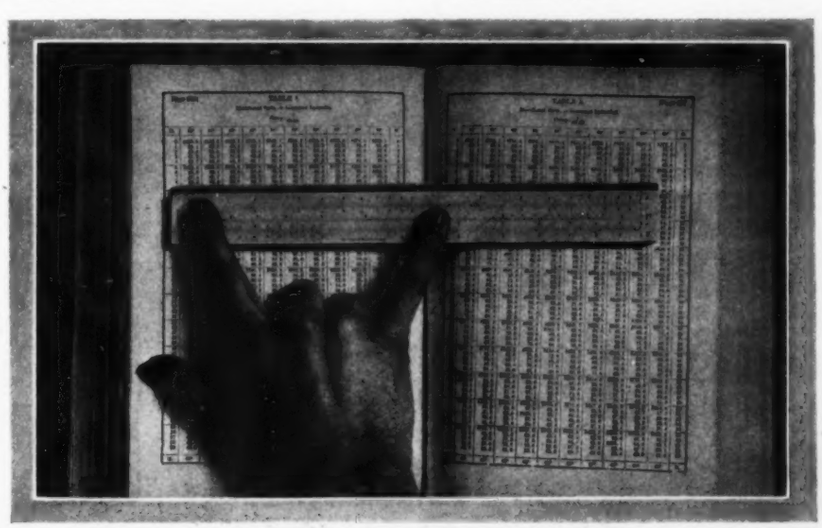
is required a method called Mercator sailing is used. This method is based upon the distorted Mercator chart, but nevertheless is accurate even in high latitudes. To find a course and distance between two positions by Mercator sailing, find the difference of latitude and the difference of longitude in minutes just as they were found in working the same problem by middle latitudes. Then look up in Table 3 of Bowditch and write down alongside each latitude the corresponding number found from Table 3. These numbers are called the meridional parts for the two latitudes. Subtracting the lesser of these numbers from the greater gives the meridional difference of latitude. Look in Table 2 for a place where the meridional difference of latitude occurs in the difference of latitude column alongside the difference of longitude in minutes in the departure column. When the coincidence is found the course may be taken from the top or bottom of the page, according to whether the meridional difference of latitude or the difference of longitude is the greater. To get the distance, the difference of latitude in minutes (not the meridional difference of latitude) is looked up in the latitude column on this same page and the distance taken from the distance column. Problem 5 illustrates the method fully. The student can get good practice by solving Problems 2, 3, and 4 by Mercator sailing, the results should check the results obtained by middle latitudes very closely. As was the case with middle latitudes, if some of the quantities are too large for the tables, they may be reduced by division by a convenient divisor and the distance obtained with the reduced values must then be multiplied by this same number. The course obtained by this method is correct, it is only the distance that must be multiplied by the divisor used in reducing the meridional difference of latitude, difference of latitude, and difference of longitude. Mercator sailing does not fail when the equator is crossed, in this case the difference of latitude is obtained by adding the North and South latitudes and the corresponding meridional parts are added, otherwise the computation is the same. Problem 6 illustrates this. Mercator sailing is very rarely used to find the new position of a vessel after sailing a given course and distance from a known position. The problem seldom occurs in practice except in high latitudes, and it will not be taken up here. An excellent illustration of this method is given in the first example worked on the top of page 79 in Bowditch.

Where long courses are to be handled the method of working Mercator sailing by inspection of Table 2 becomes inexact and cumbersome, and for these cases there is a method of solution that while it involves the use of logarithms, is generally more satisfactory than the method by inspection. Before explaining this method a few words will be said about logarithms in general.

Logarithms are a series of numbers arranged in a table in such a way that the logarithm corresponding to any given number may be readily found and the number corresponding to a logarithm may be found as easily. By the use of logarithms the cumbersome processes of long multiplication and division are rendered unnecessary, as to multiply two numbers together it is merely necessary to find their logarithms and add them together, the number corresponding to the resulting logarithm is the product. Division is carried out by subtracting the logarithm of the divisor from the logarithm of the number by which it is to be divided, the remainder being the logarithm of the result. Logarithms consist of two parts, the body of the logarithm (called by mathematicians the mantissa) which is the part of the logarithm lying to the right of the decimal point and the index or whole number lying to the left of the decimal point. Thus the logarithm of 784 is 2.89432, the mantissa or body of the logarithm being .89432 and the index being 2. Table 42 in Bowditch is a table of logarithms of numbers from 1 to 9999 but from this table only the mantissa of the logarithm is found except that on the first page of the table complete logarithms of numbers from 1 to 100 are given. The index of a logarithm is written by the rule that the index is always one less than the number of figures lying to the left of the decimal point. Thus in getting the logarithm of 784 this number was found in the column of numbers on the left hand side of page 767 and the mantissa taken from the column headed O because there was no fourth figure to be considered, such as there would have been had the logarithm of 7843 been desired. The mantissa obtained from the column headed O is 89432 and it is therefore written down with a decimal point to the left of it, the index is obtained by counting the number of figures lying to the left of the decimal point in 784 and subtracting one from it. Where a number like 784 has no decimal point written with it the point is understood to lie to the right of the last digit and the index of 784 is therefore 3—1=2. If the logarithm of 78.43 was desired the same page in Table 42 would be consulted and this time the mantissa would lie to the right of 784 and would be in the column headed 3 at the top of the page. The mantissa would be 89448 and this time the index would be 2—1=1. The complete logarithm of 78.43 equals 1.89448, or as it will be written in all computations, log. 78.43 = 1.89448. From what has been said already the reader will see that the mantissa of a logarithm controls the sequence of figures in the corresponding number and has nothing to do with the position of the decimal point. By an inversion of this rule the sequence of figures in a number decides what the mantissa of its logarithm is going to be and the decimal point has noting to do with this. The index controls the position of the decimal point and it does nothing but show how many figures lie to the left of the decimal point in the number corresponding to a certain logarithm. Thus the logarithm of 7.843 = 0.89448, the logarithm of 784.3 = 2.89448, and log. 7843 = 3.89448. To multiply two numbers together it is necessary to add their logarithms, so to multiply 784 by 7.843 add 2.89432 to 0.89448 the result being 3.78880 (notice that in adding, the logarithms were handled just like any other decimals, the "one to carry" being taken across the decimal point just as in adding cents and dollars) and the number corresponding to this logarithm looked up in Table 42. In looking up the number the index was first of all neglected and the mantissa alone received attention. Looking through the logarithm part of Table 42 the reader will find 78880 on page 764 the number corresponding to it being 6149, the first three digits are from the left hand column of numbers and the fourth digit from the top of the page. So far the figures alone have been obtained, and the decimal point has not been located, but as the index is 3 there must be one more, or four figures lying to the left of the point and the number is 6149. The process of division is carried out in a similar way, only here the logarithms are subtracted instead of being added. In the appendix of Bowditch there is an excellent discussion of logarithms and their various uses in navigation. This discussion begins on the lower part of page 271 and should be thoroughly mastered by the beginner. Special attention should be given to the manner of finding the logarithm of the function of an angle from Table 44 of Bowditch, only a few words will be said about that work here.

Those who are familiar with trigonometry will know what is meant by the function of an angle, but those who have not studied the subject, or have completely "gotten over it" can use these quantities without difficulty. Each angle has certain properties represented by numbers which have been called sines, cosines, tangents, cotangents, secants, and cosecants. Table 44 is a table of the logarithms of these functions and

(*Continued on page* 54)

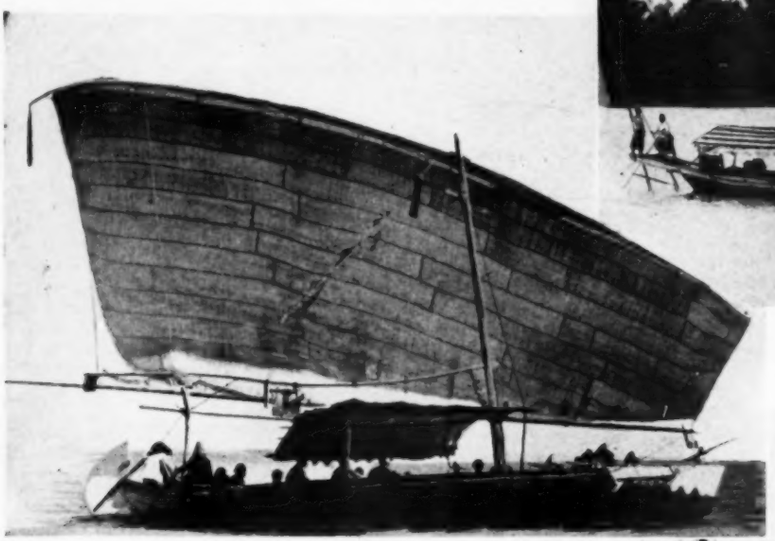


Using the Bowditch tables. A ruler is a great help to accuracy in taking values from some of the large tables. It guards against taking a value from the line above or below the correct one

Motorless Boats of Foreign Waters

Picturesque Craft from the Land of the Oldest Civilization, Where the Marine Motor is Still Almost Unknown—Oriental Vessels Which Run Much More to the Bizarre Than to the Practical

A Javanese trading vessel with a tremendous spread of sail which makes good speed—when the wind blows—if it doesn't blow too hard



The houseboats of the Singapore River are not the locomotive floating palaces of our own waterways. They are propelled by pole and tide, while their almond-eyed owners lounge beneath thatch-roofed cabins and enjoy their Oriental repose

THE queer sailing vessels shown in the illustrations on this page are in marked contrast to the designs with which we Americans are familiar, and you'd have a long search to find the motor boatman who would care to make an even swap for one of them. The Orientals, who were building boats when our civilization was in an embryonic state, have turned their talents in the direction of ornamentation rather than that of utility, and have not yet realized that the most elaborate carving doesn't quite take the place of an auxiliary motor. It's up to American motor manufacturers to preach to them the gospel of reliability.

The lofty steering chair of the Burmese rice boat shown in the lower left-hand illustration. The steersman is seen grasping the tiller, which connects with the post of the offset rudder. Elaborate and costly though the wood carving of vessels of this type may be, it doesn't help out much when the wind dies away.

A square-rigged rice trader on the Irrawaddy River in Lower Burma. It would be something of a problem to determine just where to install auxiliary power in this queer craft

This Chinese junk is not dissimilar in design from our own coastal lumber schooners. She'd be more efficient, however, if there were a propeller churning away under her broad counter

The students must be familiar with every detail of the motor boat hull as well as the engine. They are building two more boats for use at the school as soon as the ice goes out

Jackies Who Have Never Seen the Sea

Motor Boatmen of Our Inland Confines Who Are Preparing Themselves at the Dunwoody Institute for the Deck Force and Engineering Crews of Our Submarine Chasers

By Willard Connely, U. S. N. R. F.

A MAN in the uniform of a chief petty officer in the navy stepped nimbly out on a dock jutting from the shore of Lake Calhoun, in Minneapolis. The afternoon was bleak, with gusts of snow, and the man shook his arms and legs as a skeleton might tremble if pushed. In succession he eyed five long blue motor boats rubbing indifferently against the pilings. He jumped into the longest boat, jumped like a cat, bent low and peered at the engine a full minute. This procedure he repeated in each other boat, then with apparent satisfaction climbed back on the wharf.

All at once a company of sailors scampered down to the water's edge and took their places in the various blue boats, which they made ready to get under way. But mumbling was heard.

"Mr. Stewart," came a voice, "there's water in here, sir."

"Mr. Stewart," protested another, "this engine's got sump'n the matter with it—I think it's water."

Then a third rather a growly one, "Here's a crankcase full of water!"

Stewart, the chief petty officer, said crisply:

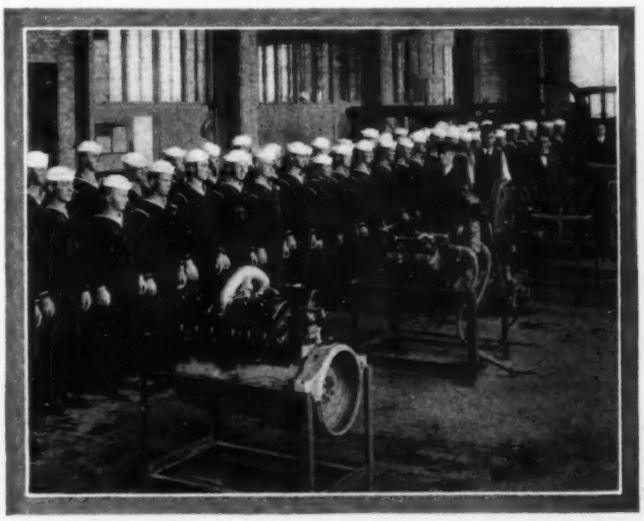
"Yes, it's water. I'm glad you know water when you see it. I put it there myself, and it's your job to get it out. See how fast you can work on a cold day."

That is the reason the gas-engine apprentices of the U. S. Naval Training School at Dunwoody Institute swear by Stewart. He is bluntly honest with them and he tries their mettle. At the time of the foregoing incident the motor boat jackies had learned well enough how to prevent water from leaking into the mechanism, but there was the first occasion upon which they were confronted with it in troublesome places. In the classroom Chief Instructor Kent had told them what to do in such an emergency; it remained for Stewart to see whether the men had listened. At any rate no one had slept, as the chief petty officer concluded later that afternoon. One by one the boats were started, ostentatiously, and they spanked away over a lake choppy with whitecaps.

The sailors took Minnesota by surprise. Though the civilians could offer no solid reason for doubt they believed the Navy Department would never sanction a training base farthest inland. Dunwoody itself was destitute of marine equipment except insofar as machinery and tools for certain trades are alike ashore and at sea. The Bureau of Navigation wanted blacksmiths and coppersmiths, cooks and bakers, machinists and carpenters, electricians general and radio, and pilots for motor boats. So Dunwoody hastily sent two of its chief instructors to Navy Yards to find out what was requisite; one man went to the electrical school at the New York Navy Yard and the other to the naval gas engine school at Charleston. There they determined the principal needs of bluejackets for their departments, reported back to Dunwoody, and the matter was straightway taken up with the Bureau of Steam Engineering.

Remarks of the Bureau were highly favorable, lending themselves to speedy action. The indispensable machines and supplies were rounded up in Navy Yards on the Atlantic Coast all the way from Portsmouth to Key West. In order that some idea may be formed of the nature of the training given the Dunwoody motor boatmen, it may be well to cite certain of the accoutrements sent in from the seaboard by the navy. From the Key West station came motor control equipment. New York furnished searchlights and signal devices, including a portable tube blinker, also a supply of push buttons, connection boxes, bells, annunciators, buzzers, with an evaporator, a Dinkel steam trap, circuit breakers, light and power fixtures such as distribution boxes, junction boxes, deck lights, switches. (These smaller appliances are a necessary adjunct for study as an introduction to the electrical side of gas-engine processes in the navy.) The Boston Navy Yard sent small reversible steam engines, while from Philadelphia came steamer propellers, old gun elevating motors, motor starting apparatus. Norfolk contributed water-testing sets, Portsmouth, motor parts, and the Dunwoody authorities themselves, after diligent search around the Twin Cities, uncovered a four-cylinder Van Blerck gas engine, which they purchased and installed forthwith at the Institute.

Having made intensive observations at the shops in Charleston Navy Yard, Chief Instructor Kent returned to Dunwoody to map out his course of training for the motor boat bluejackets. Through concentrative teaching and insistence upon rigid application from each apprentice he estimated that he could train pretty good motor boatmen in a wartime schedule of thirty-six double periods, or eigh-



Class lined up for instruction in the care of motors. Automobile as well as marine motors are used for this purpose

teen weeks, assuming the men to have had no considerable gas-engine experience before enlisting.

With five full working days per week, using the Saturday half-day for tests and reviews, the instruction has been divided in this manner: four half-days at the lake, repairing and operating craft with speeds of 15 to 25 statute miles per hour; three half-days in the auto shop, taking down, renovating, and reassembling gasoline engines; three quarter-days of classroom work, studying theory of gas engines, of starting and lighting; three quarter-days in the testing laboratory, operating gas, oil, and steam launch engines, taking horse power tests, setting valves, recording indicator cards.

The upper illustration shows two of the Dunwoody motor boats and the lower one the gasoline engine testing laboratory

Five gas engines, five steam, and one oil burner comprise the principal appendages of the laboratory. To many of the naval students steam has not been as attractive, as yielding to persuasion, as the gas motor. One jacky who had borne particularly ill luck in his engine tests shook his head dolefully and said to the instructor:

"I never will get steam. Somehow it ain't as trustworthy as gas."

But Ensign Colby Dodge, U.S.N., commanding officer of the Dunwoody Naval Detachment, and Assistant Director Kavel of the Institute who supervises the routine of the courses themselves, have decreed that steam engine work is by no means to be slighted, that a competent motor boat pilot must know not a type, but types.

Instructor Kent has divided his course into sixteen phases, or groups of subjects in progression. In order clearly to visualize the breadth of training Uncle Sam provides free in a typical branch of the naval service, those interested in motor boats may care to read a condensed technical resumé of the work taken up.

To start, three double periods, or a week and a half, are given to engine types—their history, a study of basic principles, survey of two- and four-cycle kinds, general construction and arrangement of parts.

Next the same amount of time is allotted the crankcase and attached parts. This group includes the study of crankcases of two- and four-cycle engines, bearings, crankshafts, flywheels, counterbalancing, connecting rods. It can be seen that by introducing the bluejacket to the anatomy of motor boat engines his sense of fascination is tapped early.

From crankcases to cylinder parts, their structure and collocation. Two double periods are given to two- and four-cycle cylinders, to pistons and rings, then twice the time to valves, springs and timing to camshafts and timing gears. Cooling systems follow, with pumps and piping, and lubrication including a description of systems and of the characteristics of the various oils. Through four double periods is studied carburetion subdivided into fuels and their uses, mixing valves, carbureter types, fuel tanks and piping systems, manifolds and mufflers, inlet, exhaust, cut-outs.

Strict naval discipline is maintained at the school. Chief petty officers are in charge of the men until they leave Dunwoody

Students receiving practical instruction in the operation of machine tools and their use in making repairs on marine motors

The first half of the course concludes with a detailed investigation of the Norfolk Navy Yard engine. Each sailor is examined severely on the points of this engine so far as covered by study in the classroom during preceding weeks.

There is no sharp line of division between the first and second halves of the teaching, for the ninth phase welds immediately with the eighth in a similar treatment and examination on the Van Blerck engine.

Then the men go on with the significant matter of ignition, on which they spend the longest time of any topic—six double periods or three whole weeks. The subject covers an explanation of the various systems, wiring, coils, interrupters and distributors, magnetos and generators. Naturally ignition is followed by starting and lighting, with generators and motors, wiring and cut-outs, storage batteries, lights. To all this transmissions systems are of course in sequence, involving manipulation of gear sets and reserve gears, thrust bearings, propeller shafts and propellers.

A separate week is devoted to the oil engine, and by this time the bluejacket has evinced his anxiety to know all kinds. Formidable at first, his vocation lures him on, rapaciously, like the booklover who gets deeper and deeper into the nuances of writing. After completing the tests with oil fuel, the jacky welcomes almost defiantly his final examinations on the Norfolk and Van Blerck engines, covering the remaining points about them not touched upon previously.

The last phase is boat construction. This work prepares a bluejacket to look after the general upkeep of motor boats such as used abroad big ships in the fleets. The Dunwoody naval student is drilled in displacement theory, hull building, engine mounting, control and signals. He thus acquires a knowledge of repairing and overhauling all woodwork as well as the mechanical appurtenances.

Owing to a carefully mapped week-to-week progress in teaching, the chief instructors in carpentry and gas-engineering at Dunwoody have so co-ordinated the suc-

(*Continued on page* 62)

White Cap Discovers Cape Cod

The First Auxiliary of MoToR BoatinG's Ideal Cruiser Fleet Lengthens Her Trial Run into a Trip Through the Canal West and South to Her Home Port in New York Harbor

By Edwin W. Kendrick

THE cause of this cruise rests with a 27-foot auxiliary sloop, in the construction of which was incorporated so many of the characteristics of a New England dory that the owner, for that and sundry other reasons, decided to have her built Down East!

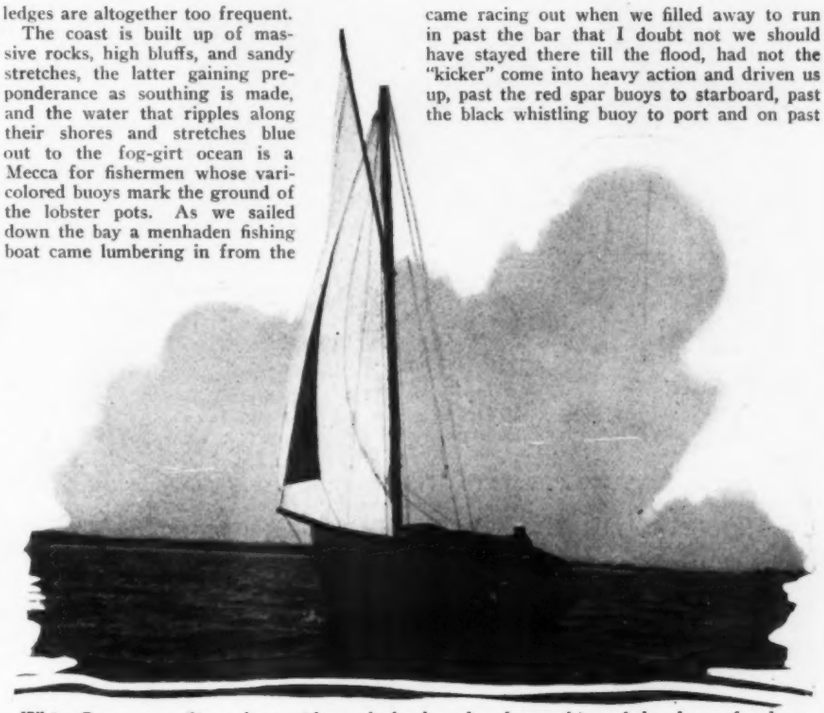
Promptly according to schedule, I, the owner, and my sailing partner arrived, one sunny May morning at Swampscott in Massachusetts where she was built, although we had received a wire only two days previously warning us not to come as such a gale was blowing that they had been unable to launch the boat.

However, the weather having moderated, she was in the water when we got there, and the day, as I have said before, was beautiful. The three-masted schooner Lucia Porter, driven high on the beach and going to pieces, alone bore testimony of the past.

That one day at Swampscott served to forage the boat and get things into running shape, and the next morning, bright and early, we had let go our mooring in Nahant Bay, and were swinging around Egg Rock. I may say here though, that we always steer a compass course, laid off on the chart no matter how fair the weather is, and as each landmark, light, or buoy is picked up we mark the time at that spot on the chart. Thus we have a record of past performances to go by in case of fog or other circumstance that might make us doubtful of the boat's position.

Five miles' run past Egg Rock saw us abreast of The Graves lighthouse, past which commerce of the world flows up and ebbs through dear old Boston Bay to Boston. But our course lay right across their tracks and on to Minots Ledge, which is near Cohasset Bay, into which we had planned to run if the weather took a bad turn. However, although there are several harbors on the coast from the time you pass Hingham Bay till you arrive off the twin towers of Gurnet Head they are best left alone except to men having local experience. The channels are tortuous and rocks abound and wicked sunken ledges are altogether too frequent.

The coast is built up of massive rocks, high bluffs, and sandy stretches, the latter gaining preponderance as southing is made, and the water that ripples along their shores and stretches blue out to the fog-girt ocean is a Mecca for fishermen whose varicolored buoys mark the ground of the lobster pots. As we sailed down the bay a menhaden fishing boat came lumbering in from the sea and headed past us up the channel into Scituate.



White Cap, an auxiliary sloop with ample freeboard and something of the sheer of a dory, has the happy knack of getting there

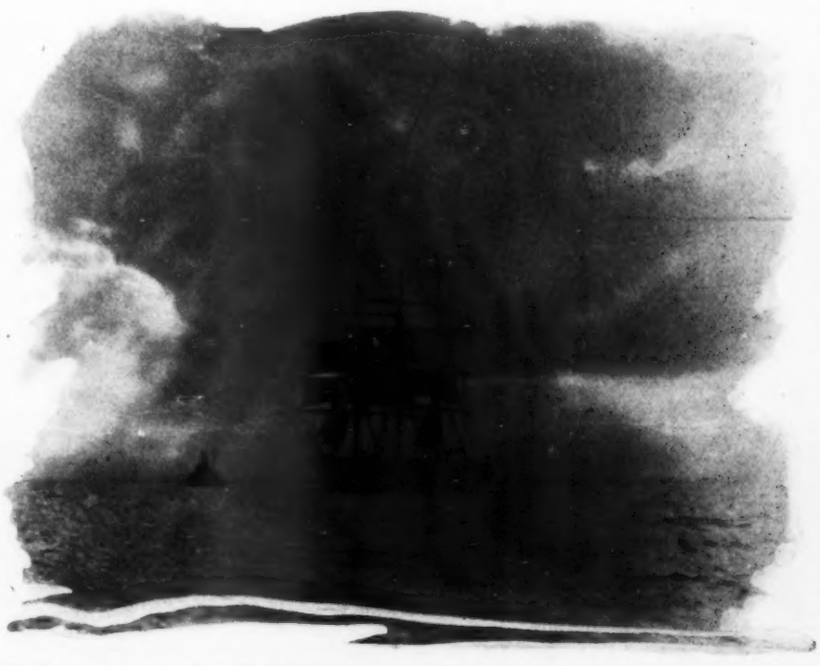
The tide chart marks a current of only six-tenths of a mile for these parts of Cape Cod Bay, but we seemed to have a long, long beat for it after sighting Gurnet Head, the powerful headland that guards the entrance to historic Plymouth Harbor. By it runs a mighty powerful tide. So strong was the rip that came racing out when we filled away to run in past the bar that I doubt not we should have stayed there till the flood, had not the "kicker" come into heavy action and driven us up, past the red spar buoys to starboard, past the black whistling buoy to port and on past Duxbury Beacon to where we found good anchorage in the Cowyard up Duxbury Bay.

A strong tide was running when we first entered this splendid stretch of sheltered water, but as we drew farther up the bay, almost abreast of Clarks Island, it did not appear to be so bad and our little ship lay very easy to her anchor. In approaching our anchorage, however, it was necessary to exercise caution to avoid the sandy flats which become more numerous as the channel grows correspondingly narrow and erratic far up the bay. With a mean rise and fall of nine feet of tide, what may be good sailing water at one time lies a dreary waste of sand at another.

Sixty-five miles had been our day's run when we dropped our hook for the night—not a long run by any means, but a very comfortable one, most of it done whilst slipping along under sail—and when we dropped anchor two lusty appetites awaited the lamb chops, green peas, and potatoes, sizzling on the cheery little stove in the cabin. No matter whether the sea breeds men or not, that keen New England air surely bred appetites.

My sailing partner theorizes that all our nasty blows come along in the afternoon, toward three or four o'clock, and I am not sure that he isn't pretty nearly right. He also claims that the weather is usually pretty settled and calm in the early morning, unless it is already blowing great guns—when you should know better than to go out. Upon this theory we based our daily runs, and by starting out at about five in the morning we had three good hours under power before breakfast, by which time there was usually wind enough coming up from somewhere to permit us to stop the engine and sail until, as invariably happened, it became advisable to start the power again to make port for the night.

In pursuance of this belief we literally raced out to sea on the next morning's early ebb and by breakfast time when the motor was stopped we were well on our way past



When power must be supplied from without—the sailing vessel of an earlier generation

Cape Cod Canal runs through back gardens and past comfortable homesteads

Manomet Point and the Cape Ann Rocks. Slipping across Cape Cod Bay past lobstermen tending their pots and fishermen working their trawls, we almost drifted up to the inconspicuous breakwater that marks the northern side of the entrance to the Cape Cod Canal. Really, it is no mean breakwater, being two-thirds of a mile long and running out into five fathoms of water, but you must watch carefully for it and for the canal approach buoy, which is a good help.

The story of the Canal starts away back in the days of the Pilgrims, who, it seems, sailed their goods as far up the Monument River as they could and then carting them overland across the narrow isthmus, shipped them in boats again on Cape Cod Bay. Records from as far back as 1627 have it that a man in Boston had correspondence with a man in Sandwich regarding a canal that should occupy just about the same position as the present waterway.

In 1776 General Washington sent engineers to the Cape to survey for a canal, but because of his other campaigning he was obliged to recall them and drop the project. Then it appears there was a lull till an enterprising speculator came along in 1870 and with some Italians and a few wheelbarrows commenced again to dig the canal. We are told that a small hole in the ground still marks the seat of his effort. In 1883 another individual started in to dig the canal, his idea being to start an endless bucket dredge from the sands at Sandwich; but after he had gone almost two miles he too gave it up.

Finally along came the Cape Cod Canal Co., financed by August Belmont. Work was begun on June 22, 1909, at Bournedale, and with unlimited capital at its back the enterprise was pushed to a successful finish. Through fields, under roads, past back gardens the canal goes on and on till it unites Cape Cod and Buzzards Bay. It cuts off some sixty miles in the water trip between Boston and New York, to say nothing of the fogs, tide rips and bad weather that make the outside route perilous at times.

The Canal is seven miles long and will give passage to vessels up to 16 feet draft. It runs under two highway bridges, each of them 30 feet in the clear above high water, and one railway bridge at Bourne, which latter is only two and a half feet above high tide, and so has to open for almost everything. The bridges are usually opened with great promptness, but the tolls of the Canal are high enough to warrant good service, being the steepest for its length of any canal in the country. Five dollars is the fee for craft up to 30 feet, with larger ones pro rata.

Although the camera man was quite quick and very busy going through the Canal, he wasn't speedy enough to snap the brass-bound officer who stepped aboard from the patrol boat. She seemed to emerge from nowhere and raced up alongside as we entered to check up the where from and to of the boat and to take away five unsuspecting beans.

We had made the Canal at slack water, which occurs two and a half hours before high and low water at Boston, the east current beginning before Boston low water, and the west current before Boston high water. In this way by the time we had reached the farther end of the Canal the tide was running with us at about two miles an hour, and before we had got clear of the pile dolphins that mark the dredged channel over the shoals at the upper end of Buzzards Bay it seemed that the current was running fully four miles. This, into the teeth of a strong southwesterly wind, kicked up sufficient sea for a ten-knot flow, and we were glad to come abreast of Wings Neck, where we let her off to run across the small bay to the entrance of Cataumet Harbor and drop anchor under the lee of Scraggy Neck.

As it was yet early we took the dink and went ashore. Imagine our delight upon putting our bare tootsies overboard to beach the boat at striking not only that peculiar muddy sand and round pebble that is characteristic of a clam beach but real large, live, hard-shell clams. So we gathered all we needed and a few for bait and then tried fishing, but luck not being with us we tired soon, betook ourselves aboard, cooked up a good meal, and then early to bed for the morning's run.

There is good sailing water down the eastern shore of Buzzards Bay and we tacked in and off shore all the next, a wet day. But it broke up in the afternoon when the wind freshened and freed so that we finished with a fine run into Cuttyhunk, our next port of call.

The red beacon that marks the entrance to the snug little inner harbor at Cuttyhunk is plainly visible a long way off. In the channel we found it very shoal on the north side after running in close to the breakwater, but along the southern shore there was good water as we got farther in and it carried past the landing straight on across the pond to the group of stakes which indicate the pool. To one of these stakes we tied up upon invitation from a native, that being the method of mooring in those parts.

A fit place for a man to rest and ruminate

Should you get off the dredged channel you will find the water so wonderfully clear that every bit of weed and shingle and every patch of shell and sand is plainly visible. Thus you are likely to be misled and to expect every moment to have the propeller full of weed. As a matter of fact, there is easily five feet well off the channel—but have a thought for tide allowance before dropping anchor.

Little did we guess, as we ran in with a fresh fair wind that sunny afternoon, that we were entering a harbor wherefrom the fogs seldom lift at that season of the year. Next morning when we awoke to start our run the gray mantle hung all around; out at the entrance to the bay the bell buoy tolled lazily and from somewhere over the hill we heard the horn of a lighthouse. So we ate leisurely and then took the dink and went ashore and soon were very glad we stayed.

Nothing quainter nor further removed from the commercial world could be wished than the snug little harbor with its fisherfolk and the little village of Gosnold that overlooks it. The post office is about six feet square and the mails leave twice a week for New Bedford.

The one horsepower apparatus used for hauling out craft at Port Jefferson

(*Continued on page* 48)

Standardization a Success

This Type Has Proven Its Speed and Reliability and Is a Standardized Model—At Least Two Similar Boats Are in Use by Uncle Sam at the Present Time

THE result of specializing in boats of standardized design is shown in the accompanying illustrations. This runabout, designed and built by the Albany Boat Corp., of Watervliet, N. Y., is a duplicate of two that were delivered to an Atlantic coast Naval Torpedo Station last summer under their own power.

These two boats have been used in chasing and recovering torpedoes fired in tests, and have shown themselves to be fast, seaworthy and reliable under the trying conditions that this work requires.

The power plant installed in the torpedo chasers were eight-cylinder, 5½ by 6-inch Van Blerck engines operating at 1,600 r.p.m., turning a Columbian Architect propeller of 21-inch diameter by 30-inch pitch, and giving a sustained speed of 35 m.p.h. under the rigid Government test.

For pleasure purposes the power installed varies from 100 to 250 h.p. depending upon the speed desired by the purchaser. The installation has full automobile-type control, electric starting and lighting system and has all controls and instruments grouped on the bulkhead directly in front of the operator.

The hull is finished in mahogany throughout, with upholstered seats in the forward cockpit, across the stern and bucket-type seats just after the engine compartment bulkhead.

Ample ventilation is provided by a low-type cowl on the forward deck and two regular pattern cowls on the engine hatches. Small open ports are provided on each side of the engine compartment, just under the guard.

Two views of the standardized 35-foot runabout when under way. These boats are capable of a maintained speed of 35 m. p. h. and are as comfortable as they are fast

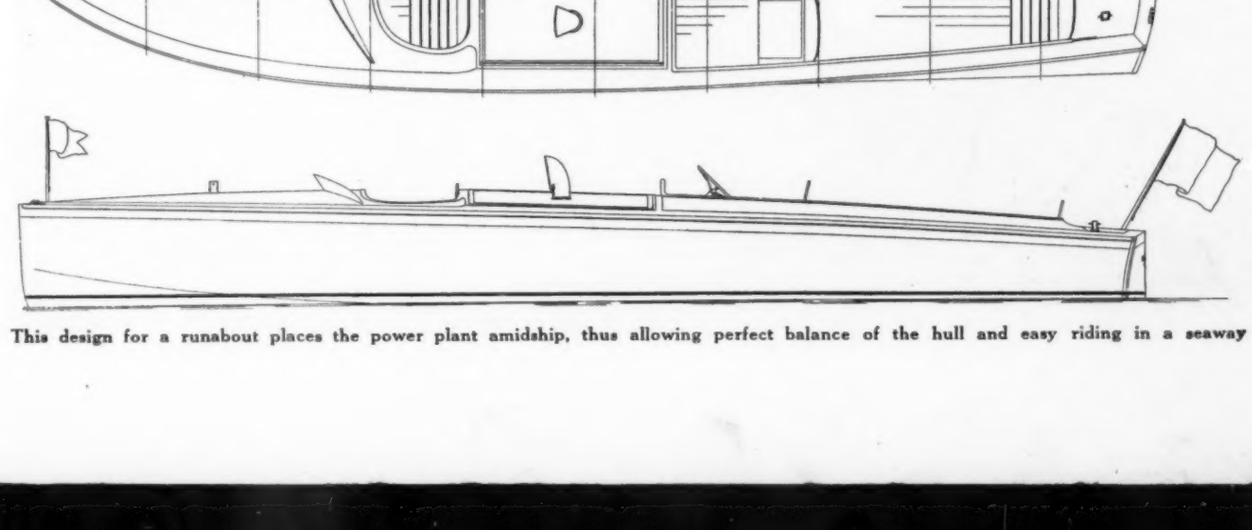
A 37-Mile V-Bottom Runabout

A 30-Foot Runabout With Small Observation Cockpit Forward to Accommodate Two Passengers This Model Has Proven Very Successful and Speedy and Is a Good Boat in a Seaway

THE plans reproduced below show a 30-foot V-bottom runabout designed and built by William H. Hand, Jr., of New Bedford, Mass., for Samuel A. York, of New Haven, Conn., for use on Moosehead Lake, Me.

The power plant is a six-cylinder Van Blerck motor having a bore and stroke of 6 inches, and is installed under hatches amidship and is provided with full automobile-type control and electric starter. This motor drives the boat at a speed somewhat better than 37 m.p.h.

The hull is of mahogany and all metal work and trimmings are nickel-plated. The design is similar to that of Scout and Virginian, also designed and built by Mr. Hand, but has a little less beam and somewhat more power. The dimensions are: length, 30 feet; beam, 5 feet, 10 inches; and draft, 2 feet, 3 inches.



This design for a runabout places the power plant amidship, thus allowing perfect balance of the hull and easy riding in a seaway

Many Newly Built Runabouts Are

Spero III is 38 feet long with a beam of 6 feet, one of those long, roomy runabouts that displace a lot of water, yet have lines so fine that they slip along with very little disturbance, and with such a smooth acceleration that one has no idea how fast the craft is traveling excepting for the passing shoreline. The H. C. Minnett Boat Wks., of Bracebridge, Ontario, built Spero for R. E. Clemenson, of Pittsburgh, Pa. The motive power is a Model F, counterbalanced crankshaft, six-cylinder Sterling rating at from 130 to 145 h.p. A speed of 27½ miles an hour is obtained. Spero III is among the finest craft the Muskoka region can boast of

J. M. R., a 26-foot concave V-bottom runabout, designed by Albert W. Crouch and built by Oscar Van Sant of Atlantic City, is powered with a Model FS, four-cylinder Sterling motor

Hutchinson Bros., of Alexandria Bay, N. Y., retain a demonstrator, a high-grade mahogany runabout 28 feet long with a beam of 5 feet, 8 inches. Her Sterling Model F, four-cylinder 90-100 h.p. motor turns a Columbian G, 18 by 28 propeller at 1,400 r.p.m.

Julita, a 30-foot V-bottom runabout with a beam of 6 feet, powered with a four-cylinder Model FS, 100 h.p. Sterling. She was designed and built by Brown Bros., of Marblehead, Mass.

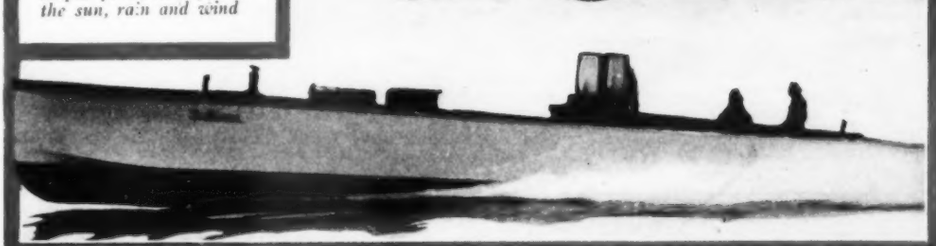
Hoosier II owned by H. R. Buckwall, is a 35-foot Albany runabout now at Lake George. The boat is powered with an eight-cylinder Model FS Sterling. Turning 1,400 r.p.m., 200 h.p. is developed and a speed of 35 m.p.h. is obtained

Sea Wolf, a standardized 25-foot runabout with a 6-foot beam, designed and built by the John L. Hacker Boat Co., of Detroit, Mich., and powered with a four-cylinder Model H. B. Scripps motor, rating from 30 to 35 h.p., which gives her a speed of 20 m.p.h., is the property of J. Edward Schipper, technical editor of Automobile, who uses it from his summer home at St. Clair Flats, Mich. Sea Wolf is fully equipped with a single unit electric starting and lighting system, Bosch magneto, Schebler carbureter, Willard storage battery, etc., and has a seating capacity for six persons

An Indication of Boating as Usual

Zozette of Glengarriff is a 28-foot V-bottom runabout with a 5-foot beam, designed by William H. Hand, Jr., of New Bedford, Mass., and built for Myron E. Wheeler by Arp Bros., of Okoboji, Iowa. The planking is of cypress, that durable boat sheathing, the decks of mahogany, and the interior finish quarter-sawed oak. The rear seat is upholstered with leather, also the forward seat, which is divided, permitting access to the cockpit without climbing over the back. The dash equipment includes fire extinguishers, electric lights and a cigar lighter. She is driven by a 50 h.p. Sterling motor, giving a speed of 32 m.p.h. and Mr. Wheeler claims that she is one of the fastest boats on the lake

The sedan runabout on the right is a stock boat designed and built by the Gas Engine and Power Co. and Chas. L. Seabury Co., Cons., of Morris Heights, N. Y. The cabin affords ample protection from the sun, rain and wind

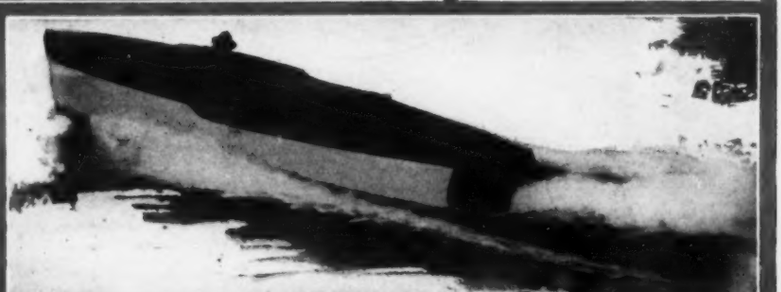


Gallian has been driven from Algonac, Mich., to Detroit with eight passengers in 65 minutes. This beats the D. U. R. cars by 1¼ hours, again proving that the man with the boat has it all over the land lubbers. This boat carries two Van Blerck sixes and was built by the C. C. Smith Boat and Engine Co.

An exceptionally speedy runabout designed by F. K. Lord. The motor is installed under the deck just forward of amidships, and the craft trims beautifully at high speed. A complete electric system for starting and lighting is included in the equipment

Seamahr, shown on the left, is the winner in the open boat class in the Holley Beach Races, held September 1, 1917, under the auspices of the South Jersey Association, and is the property of E. H. Rollman. Seamahr has a rating of from 40 to 50 h.p. and is an exceptionally fine little craft.

The new Friendship XI, designed for his own use by Harry L. Friend, of Boston, Mass., one of the best-known amateur designers, is equipped with a 50 h.p. Sterling, which turns a 20 by 20-inch propeller at 1,200 r.p.m., giving a speed of 22 m.p.h. There is a wide hatch over the motor and one over the compartment forward of the helmsman's cockpit. The forward compartment also has a hinged deck which is intended to open back for safe and easy handling while mooring. There are controls located in both forward and rear cockpits. Mr. Friend is noted for his famous line of Friendships



Friend Ship—A Luxurious 30-Footer

A Fast, Comfortable and Seaworthy Runabout for Use in Wisconsin and Florida—The Mahogany Hull and White Enamel Deck Make a Striking Appearance

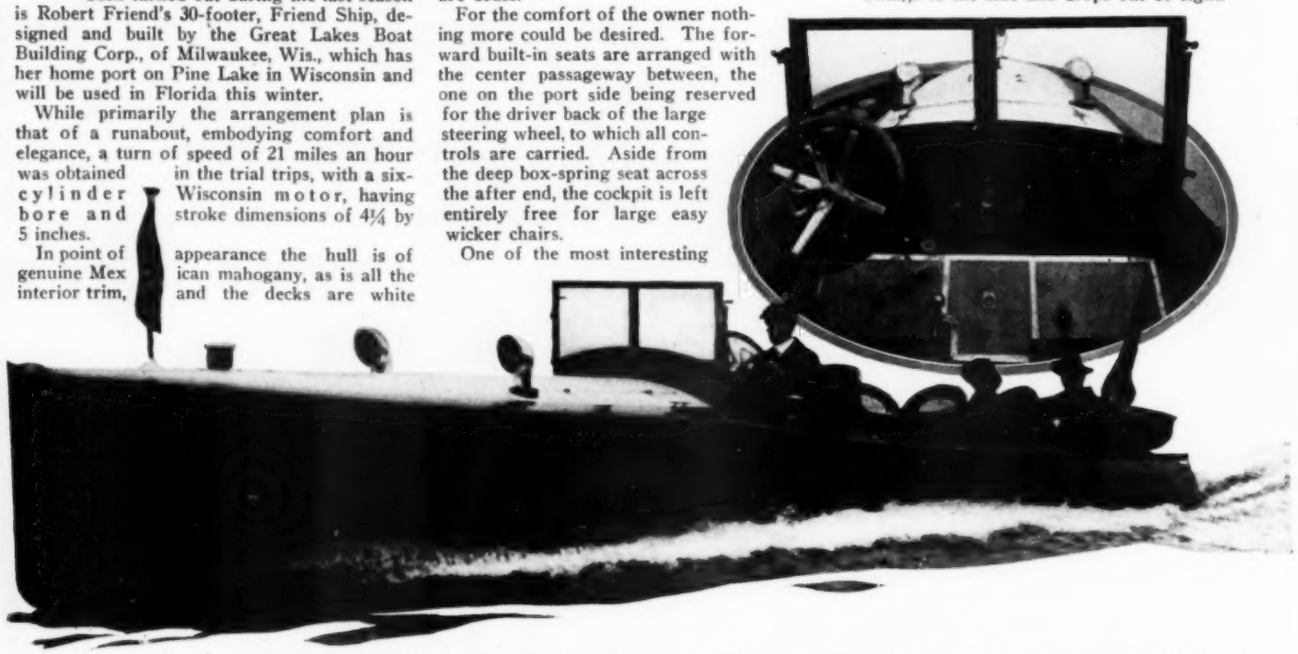
WITHOUT doubt one of the finest and most luxurious runabouts that have been turned out during the last season is Robert Friend's 30-footer, Friend Ship, designed and built by the Great Lakes Boat Building Corp., of Milwaukee, Wis., which has her home port on Pine Lake in Wisconsin and will be used in Florida this winter.

While primarily the arrangement plan is that of a runabout, embodying comfort and elegance, a turn of speed of 21 miles an hour was obtained in the trial trips, with a six-cylinder Wisconsin motor, having bore and stroke dimensions of 4¼ by 5 inches.

In point of appearance the hull is of genuine Mexican mahogany, as is all the interior trim, and the decks are white enamel. All the instruments on the dash are of nickel finish and all fittings on the deck are brass.

For the comfort of the owner nothing more could be desired. The forward built-in seats are arranged with the center passageway between, the one on the port side being reserved for the driver back of the large steering wheel, to which all controls are carried. Aside from the deep box-spring seat across the after end, the cockpit is left entirely free for large easy wicker chairs.

One of the most interesting features of this runabout is the patented disappearing windshield which, when not in use, swings to the side and drops out of sight.



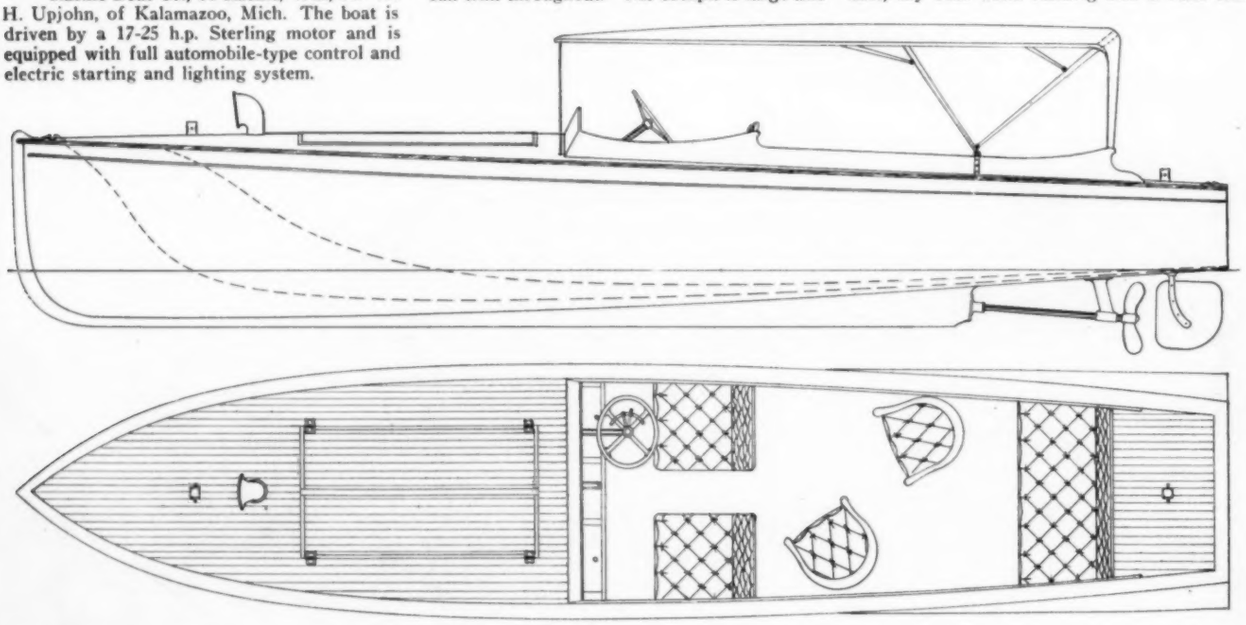
Friend Ship at 21 m. p. h. makes very little fuss in going through the water. The upper illustration shows the extreme similarity in the arrangement of the controls to those of an automobile

A 25-Foot Displacement Runabout

This Design Provides the Maximum Room in a Boat of This Size—The Cockpit Layout Follows Closely the Scheme Used in Larger Boats and Assures Comfort for the Passengers

THE accompanying drawings show a 25-foot runabout designed and built by the Racine Boat Co., of Racine, Wis., for W. H. Upjohn, of Kalamazoo, Mich. The boat is driven by a 17-25 h.p. Sterling motor and is equipped with full automobile-type control and electric starting and lighting system.

The hull is constructed substantially with oak keel and frames, cedar planking and quartered-oak trim throughout. The cockpit is large and roomy and can accommodate eight people. The graceful flare forward assures a comfortable, dry boat when running into a head sea.



The lines show a good flare forward, with easy entrance and a straight run aft. The arrangement of the forward seats is unusual in a boat of this size

Will Concrete Replace Wood?

From Several Standpoints the Newer Material Seems to Have Advantages Over the Older Method of Plankin Boats—No Caulking Required and the Troublesome Leak Forever Eliminated

REGARDING the use of concrete in the construction of motor boats much has been said and a little accomplished during the last few years. Motor boatmen who scoff as well as those who are open to reason may be interested in a non-technical discussion of the subject and in some of the following examples now in actual service.

The merits of such craft are known. Among their recommendations are the simplicity and rapidity with which they can be constructed, the readiness with which repairs can be executed, high resistance to strain and shock, incombustibility and fire resistance, relatively low cost and the virtual elimination of maintenance charges.

Sand, stone, cement, steel reinforcing bars and structural steel shapes are on the market and may be obtained promptly, therefore the materials required for concrete ship construction are readily available.

Most of the labor that is needed to build concrete ships is of the cheaper grade. Expert supervision is needed on any kind of ship construction but the number of skilled artisans required for concrete shipbuilding is small.

Caulking, heavy form work and bracing, fitting of plates and shaping of planking are entirely eliminated. Concrete in its plastic state lends itself to any shape. There is no joiner work as required with wood. Jars can loosen no rivets.

Due to the elastic strength of the material reinforced concrete lends itself to the most modern developments in shipbuilding design, and although the skin of the hull must necessarily be thicker than when steel plates are used, it need scarcely be thicker than would be the case if timber were employed. Assuming three inches to be the thickness adopted, the weight per square foot would be less than that of steel 1 inch thick. Therefore the question of dead weight does not appear to constitute a very serious objection, especially in view of the fact that the weight of the hull of a vessel is small in comparison with the weight of equipment, fittings and cargo.

It is stated that on concrete boats and barges already in service barnacles do not gather as they do on wooden and steel ships.

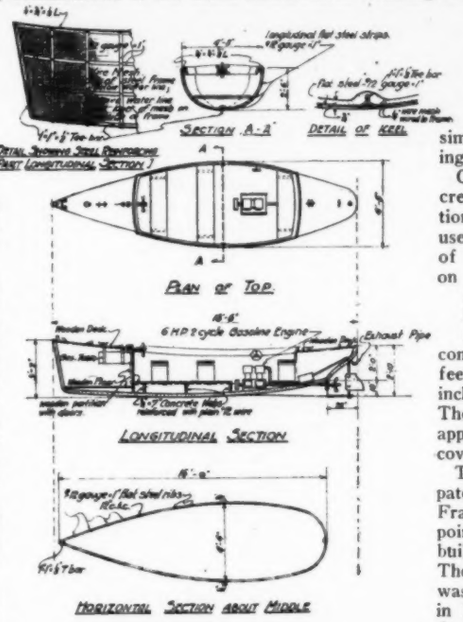
While badly made concrete has suffered deterioration in a few cases, there is ample evidence of the fact that correctly proportioned and carefully prepared concrete is not injured by prolonged immersion in sea water. A series of tests commenced seven years ago in Boston Harbor, and still in progress, showed in 1914 that specimens made of really good concrete were in splendid condition after five years' alternate immersion and exposure to air, while other specimens of poor concrete had suffered considerably under the same conditions. Concrete gains in strength in proportion to the length of time it is mixed, up to a certain point, of course. It is this lack of thorough mixing that is one of the most frequent causes of poor concrete, and this happens just as often in other forms of concrete construction as in the building of concrete boats.

Carl Weber, a well-known concrete engineer and president of the Cement Gun Construction Co., of Chicago, has invented and developed a new system of concrete construction which he calls Torcrete. By using a steel frame and a multiple, laminated woven-steel reinforcement and by applying the concrete for the hull with compressed air, the weight of the concrete vessel practically has been cut in two. By entirely eliminating the forms formerly needed, the cost of the ship is greatly reduced and the time of the construction is only about one-third of that formerly needed. This new machine is said to be a decided improvement on the cement gun.

There is another machine on the market in which the mixing is done in a separate chamber, and the mixed material is forced through the discharge pipe by means of steam under pressure. This is called the concrete atomizer and is the invention of Harold P. Brown, of New York.

It is said that these methods can be employed advantageously for the reconstruction and repair of old steel ships and for placing bulkheads, tanks and decks in old hulls. For tank barges, ore and coal boats, refrigerator ships and similar vessels, the advantages of a non-rusting ship will be recognized quickly.

Concrete, built by Walter M. Dowsey, of Iron River, Mich., was presented to the Government on October 21, 1917, for the use of Captain W. A. Moffett, commandant of the Great Lakes Naval Training Station



On October 21, 1917, the motor boat Concrete, shown in the accompanying illustrations, was presented to the Government for use of Captain W. A. Moffett, commandant of the Great Lakes Naval Training Station, on Lake Michigan. The boat was built in 1914 by Walter N. Dowsey, an engineer in a lumber camp at Iron River, Mich., for use on an inland lake and has been in constant service ever since. The craft is 18 feet, 6 inches long with a beam of 4 feet, 6 inches and is powered with a 6 h.p. motor. The hull is ¾ inch thick. The concrete was applied with a trowel upon a light steel frame covered with ¼-inch wire mesh.

The first concrete boat was built and patented in 1849 by J. L. Lambot, of Carces, France. This structure marked the starting point in history not only of concrete boat building but of the use of reinforced concrete. The work of M. Lambot in this early attempt was investigated by the French Government in 1850, but as is so often the case further development was left to private individuals. The craft, which was a rowboat constructed of reinforced concrete planks made of mortar laid on a core of iron netting, was exhibited at the World's Exhibition in 1855, and the London Times affirms that this boat is still in service after a practical test of sixty-eight years.

Another interesting example is a schooner built in 1897, employed for some years in North Atlantic coasting trade, the serviceability of this form of construction having been practically demonstrated by the fact that the vessel escaped without injury after having been driven on the rocks near Cape Charles.

Marine Engineering has recog-

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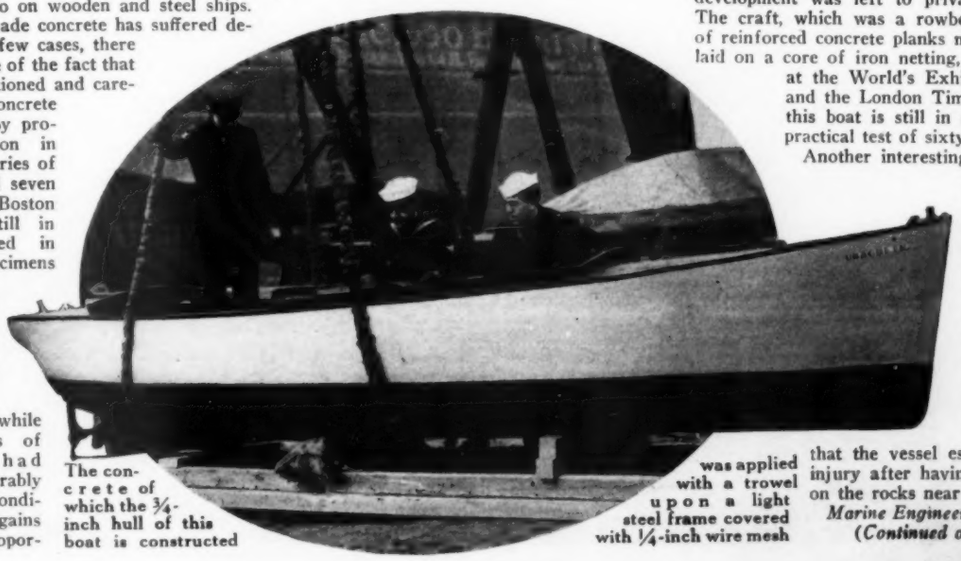


The concrete of which the ¾-inch hull of this boat is constructed was applied with a trowel upon a light steel frame covered with ¼-inch wire mesh

We Make Important Announcements

Prospects for the Biggest and Best Motor Boat Show Ever Held—The Show Number of MoToR BoatinG—My Ideal Runabout Series to Start Next Month

The Motor Boat Show

SHORTLY after noon on Saturday, January 19, 1918, the doors of the Grand Central Palace will swing open at the signal from Ira Hand, secretary of the National Association of Engine and Boat Manufacturers, and the Fourteenth Annual Motor Boat Show will be on.

Little need be said of what will be in store to greet the motor boat enthusiast as he rushes up the broad stairways leading from Lexington Avenue at the stroke of four bells. He has anticipated long before now what will be there and his guess will not be far off. He knows from experience of years gone by that the week of January 19 to 26 is going to be one round of educational enjoyment and really the beginning of the motor season of 1918 for him. After the show there will be a few week-ends of planning and even the boat covers will be pulled back far enough to allow a body to wedge his way through, and there in the cabin or cockpit you will sit in the cold admiring your little ship. The wise ones will be consulted as to the advisability of this or that change and then, like a thunderbolt out of a clear sky, off will come the winter coverings, the sound of sandpaper, scraper and blow torch will be signs more certain than the fable of the ground hog that spring is at hand.

Even at this writing, some six weeks before the Motor Boat Show opens, the indications are that it will be "Bigger and Better than Ever." Already all desirable exhibition space has been engaged and nearly all available space spoken for. The whole industry will be represented in a well-balanced manner. The largest boat ever shown within four walls of an exhibition hall will be at the Palace.

Interest in motor boating, from a sportive and recreation standpoint as well as its economic and naval importance were never more keenly felt, not only by the dyed-in-the-wool motor boatman, but by the public at large. With the enrolment of over 50,000 young men in the Naval Reserve Force, there are that many more enthusiastic boatmen to-day than a year ago. The great success of the fleet of 80-footers built in this country for Great Britain as well as the now undoubted and proven success of the hundreds of 110-foot submarine chasers built in this country, many of which are now in service in foreign waters, has conclusively demonstrated that motor boating is in a most enviable position.

There is to be a special feature at the coming show which we cannot refrain from calling to the attention of our readers at this time. We feel sure that the importance of this announcement will appeal to every motor boatman who expects to be at the Palace as well as to our many friends in the trade.

The one real feature of the coming motor boat show, according to our way of thinking, will be MoToR BoatinG's booth located on the south side of the balcony.

Last year, as many will remember, MoToR BoatinG had the largest booth ever allotted to a publication. This year our booth will be *fifty per cent. larger than in* 1917. Last year we invited all our friends to make our booth their headquarters while at the show. Many accepted our invitation, and although there was always room for more yet we have decided to take no chances this year, but to prepare for the inevitable—that is, that vast throng of enthusiasts who we feel sure will call upon us.

Furthermore, we are planning a real entertainment for you all, something of a nature not only never attempted before but probably never before thought of. We have arranged a series of motion pictures in our booth which we feel sure will interest you. Old stuff you may think—but wait. What would you think if we showed you how a gasoline engine or a motor boat is built? How it grew from the castings to the final test on the block or from the laying of the keel to the launching. Picture such a process in your mind, if you can, and then you can comprehend what we are to visualize, right before your own eyes.

In other words, we are to bring the engine shop and boat building yards of the leading manufacturers and builders as well as the works of the accessory manufacturers to the Palace. We are going to show you how each does its work step by step, from start to finish. We hear you agreeing with us already that it is to be a mighty clever stunt and we thank you for your impulsive shout of "Fine" made in unison.

This will not be all, either, for we are planning to show films of a number of the more important racing events and other activities of the year. We will show you Whip-po'-Will, Jr., actually making 70 miles an hour, as told exclusively in the December issue of MoToR BoatinG, as well as other racing events and scenes showing motor boats doing war duty.

All we have to add is—come and see for yourself—it will cost you nothing and we'll be glad to see you. If we can be of service to you in any way whatsoever, call upon us, and if we cannot, drop in and give us the glad hand, anyway. Tell us how you like MoToR BoatinG or how you think we can make our publication better.

The Show Number of MoToR BoatinG

THE February issue of MoToR BoatinG will be our Annual Show Number. Although the show is about a week earlier this year than ever before, we will follow our usual policy of having the show number of MoToR BoatinG out in time for distribution at the Palace. This will mean some pretty strenuous work on our part, but believing as we do that every one who attends the show will wish to take a copy of MoToR BoatinG home with him, containing a complete account and description of everything which is at the show, we have decided to get out our February number several days earlier than usual.

As mentioned above the February issue will contain a complete synopsis of the 1918 Motor Boat Show, a description of all of the exhibits, describing in detail just what every manufacturer has to offer. We will point out to our readers what progress has been made in the design and construction of hulls, power plants and accessories during the last year. We will pay particular attention to every idea which is new in the motor boat field.

In addition to the show features in the February issue the rest of the number will be even more interesting than usual. We have arranged for a number of star editorial features in addition to the usual articles. The first of the designs in "My Ideal Runabout Series" will appear in the February number.

"My Ideal Runabout"

AS we have already announced the Ideal Runabout Series will begin in the next issue of MoToR BoatinG. We have heard from quite a few motor boatmen that they have plans well under way for the contest and so we feel that its success is already assured. Those who submit their designs early stand the best chance of success, because as next May 15 approaches, which is the date for the closing of the contest, we will probably be swamped with designs, and as only one set of plans can be used per issue, some of the good ones will necessarily have to be discarded—so get yours in as early as possible, even though you are allowed four months.

The Ideal Cruiser Series has made a big hit everywhere. Words of approval of our efforts have flown in from all sides. Just at this moment the voting for the most popular design goes merrily on. Two are tied for first place and a third boat is not far behind. The winner will be announced in the February issue of MoToR BoatinG.

The conditions governing the Ideal Runabout Series are not unlike those of the Ideal Cruiser. No one knows better than the man who owns or operates his own craft what a runabout should be, and above all what it should not be. Generally the opinions of such a man are worth more than those of the out-and-out professional.

The plans of the Ideal Runabouts should include an outboard profile, body lines, interior arrangement plan, table of offsets, together with any additional general or detail views which the designer may choose to submit. The plans may be drawn to any scale but should be in ink either on paper or tracing cloth. A description of not over 2,500 words should accompany the plans which may be submitted any time up to May 15, 1918.

There is no limitation to the size, speed or type of runabout which one chooses as his ideal. It may be a small open "putt-putt" or a displacement racer. It may be round- or V-bottom, fast or slow. The only condition is that it must be designed and submitted by an amateur.

For each design which we publish we shall pay $35. In addition we shall allow MoToR BoatinG's subscribers to decide which one of the designs comes nearest to their ideal runabout. The design of the boat which receives the highest number of votes after the publication of the last design will be presented with $75 worth of equipment of his own selection.

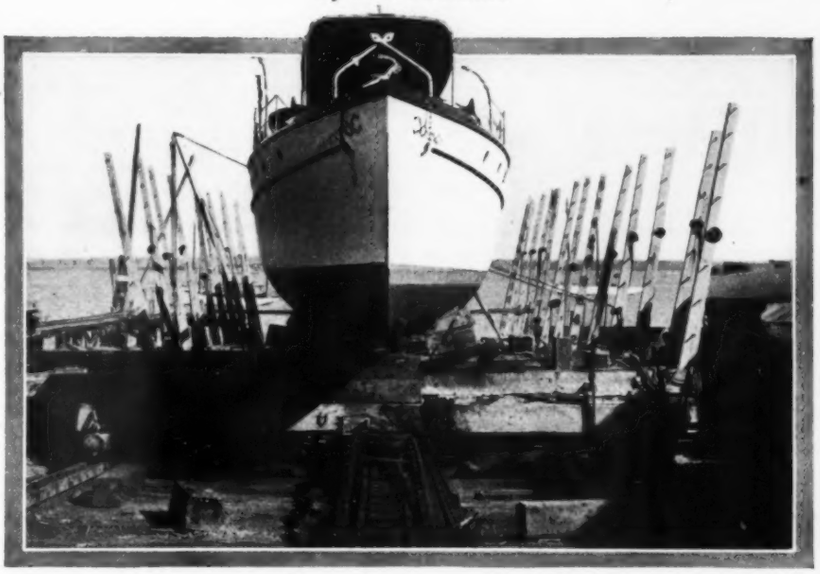
The three speedsters at the Gold Cup Races at Minneapolis: Miss Detroit II, Miss Minneapolis and Hawk Eye II

Pre-Season Painting Preparations

Some Sound Advice to the Motor Boatman Who Is Particular As to the Outboard Appearance of His Craft—Why Only the Best Paints and Varnishes Should Be Used.

By T. W. Rockwell

NOW that the 1918 season is with us, and the time to put the boats in commission will soon be here, it might be well to consider the paints and varnishes that will be used. How many boat owners are satisfied with the wearing qualities of the paints and varnishes they used last season? How did that new brand of varnish stand the weather? Did that yacht white stay white and not wash off? Was the bottom free from barnacles and weeds when you hauled her out?



Waiting for the word—a sight which should make any heart glow

With some motor boatmen the selection of the paints and varnishes for the spring overhauling is a matter of purchasing well-known and tried brands, while with others it means the purchasing of the various constituents from the nearest paint store and mixing them themselves. Now, who gets the best results?

There is not much doubt that the man who selects the branded article, backed by a reliable manufacturer, gets much better results in the long run than he who mixes his own paints. Who can test his materials and determine whether he is getting what he is paying for, proportion the various constituents to an exact formula and mix them as thoroughly as mechanical mixers used in the large factories?

Paints and varnishes sold under a brand name, backed by a responsible manufacturer with a business and reputation to maintain, are the results of years of experience, many chemical and other tests, continual experiment and the most careful proportioning and mixing possible. In other words, their business depends upon the product being always of the same grade and quality. It is well known that a successful business cannot be built upon a poor product.

It may not be out of place here to give a brief outline of the various processes and materials used in the manufacture of paints and varnishes. Starting with the materials in about the same order that the work progresses on the motor boat, the first thing used would be varnish. There are two things however that are used from top to bottom on the boat, linseed oil and turpentine, which it might be well to consider first.

Such things as driers, the introduction of small amounts of other colors to secure a clear blue-white and the addition of mineral pigments to improve the wearing qualities of a paint will not be included in this description.

The ingredient of all paints and varnishes, and the one upon which the wearing qualities chiefly depend, is linseed oil. Raw linseed oil is the product obtained by pressing ripe flax-seed. The crude oil is run into tanks and allowed to settle until the water and mucilaginous matter has settled, or the crude oil is treated with sulphuric acid and washed with water to obtain the same results. Raw oil is the most serviceable for out-of-doors.

Boiled linseed oil is manufactured by heating the raw oil in contact with certain substances, such as litharge, which increase the drying qualities of the oil. Cheap "boiled oil" is made by bringing a small quantity of raw oil to a high temperature in contact with a metallic salt, producing a drier or "japan." A small quantity of this is mixed with the raw oil at a moderate temperature, producing an oil of fair drying qualities.

Both the raw and boiled oils are sometimes adulterated with hemp oil (pressed from hemp seed), menhaden and pogy oil and some mineral oils. The best pigments will not make a lasting paint unless the vehicle (oil) used will withstand the weather and act as a binder keeping the coloring matter in place.

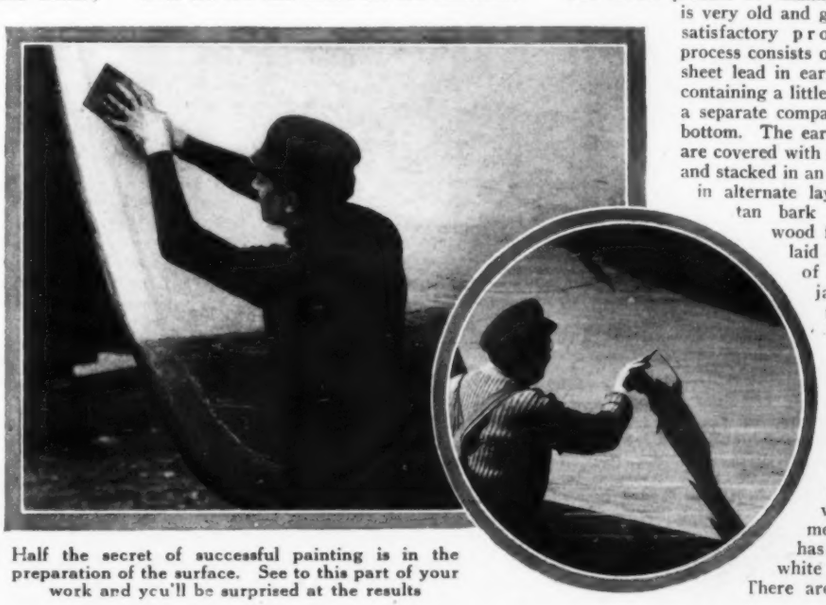
Turpentine is another ingredient in most paints, and also affects their wearing qualities. It is often adulterated, sometimes with fish oil and again with other cheap oils. Pure spirits of turpentine are obtained by two methods. The first and oldest is to collect the crude turpentine or sap from cuts in pine trees, distill it in contact with steam to free it of the resin, then separate the water from the turpentine. The other method is by the destructive distillation of resinous wood in contact with steam. The turpentine passes off with the steam and is separated upon cooling.

The body of the varnishes, or gums from which they are made, are forms of resin obtained from various species of trees. The resins used are mainly copal, anime, kauri and dammar. The general process is to dissolve the resin in linseed oil by the aid of heat, and thinning to the proper consistency with turpentine.

Of the pigments used for paints, white lead, zinc oxide, red lead and lamp black are those mostly used by motor boatmen. Of the three white lead is by far the most generally used. It also forms the basis of most colored paints.

The Dutch process of making white lead is very old and gives the most satisfactory product. The process consists of placing thin sheet lead in earthenware jars containing a little acetic acid in a separate compartment at the bottom. The earthenware jars are covered with a lead grating and stacked in an enclosed shed in alternate layers of spent tan bark and jars, a wood flooring being laid over the tops of each layer of jars to hold the layer of tan bark next above. The sheds are kept tightly closed for about three months at the end of which time the metallic lead has changed to white lead.

There are other proc-



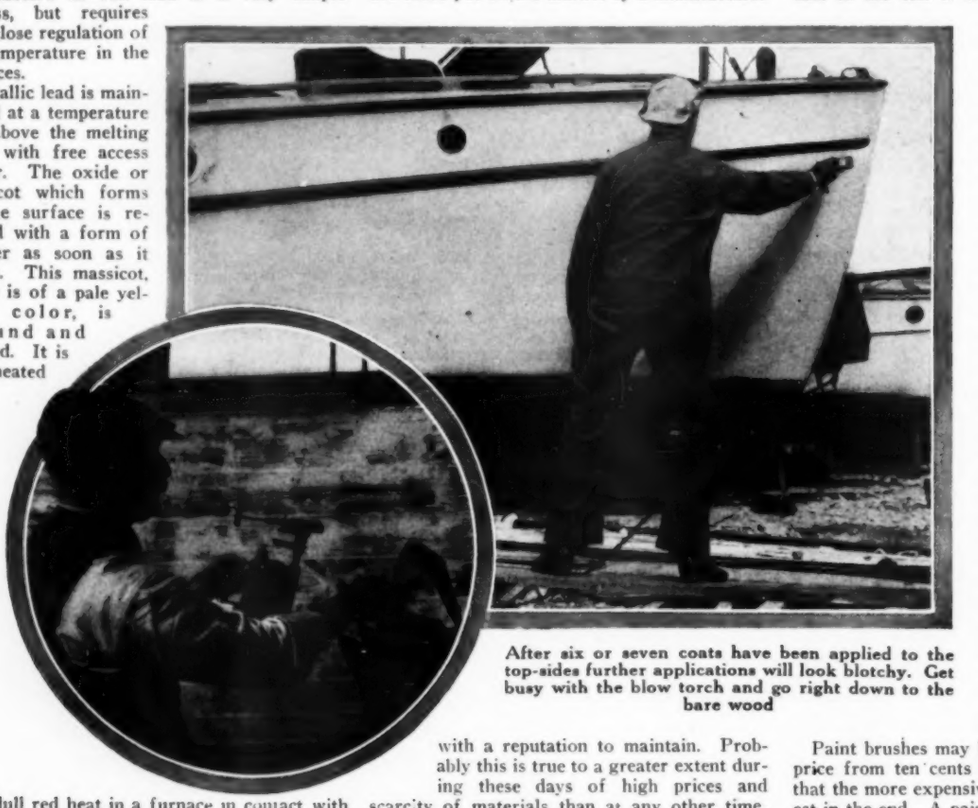
Half the secret of successful painting is in the preparation of the surface. See to this part of your work and you'll be surprised at the results

esses which act on the same principle but require less time. No tan bark is used. Generally they consist of placing sheet lead on shelves in a closed room or chamber. Steam supplies the heat, acetic acid vapors and carbon dioxide are introduced from outside sources. The reaction is about the same as in the Dutch process, but requires only about five weeks. Other processes are used and give about as good results but are only variations of the conditions under which the reaction takes place.

The process of manufacturing zinc oxide is much simpler than that of white lead. Metallic zinc is distilled in fire-clay retorts. The vapor mixing with air in a flue burns immediately and forms the zinc oxide as a fine white powder. This powder is collected in settling chambers or in large bags of cotton cloth, which allow the air to escape but retain the zinc. Some people consider zinc oxide superior to white lead for marine paints, claiming that it does not turn yellow as white lead does. Most yacht whites are principally zinc oxide, turpentine and a little oil.

Of all paints used for the preservation of metal or wood none are quite so effective as red lead ground in pure linseed oil. The manufacture of red lead is a very simple process, but requires very close regulation of the temperature in the furnaces.

Metallic lead is maintained at a temperature just above the melting point with free access of air. The oxide or massicot which forms on the surface is removed with a form of scraper as soon as it forms. This massicot, which is of a pale yellow color, is ground and washed. It is then heated to a dull red heat in a furnace in contact with air until samples, taken at intervals, show the desired color upon cooling. This process usually requires from forty to forty-eight hours.



After six or seven coats have been applied to the top-sides further applications will look blotchy. Get busy with the blow torch and go right down to the bare wood

Lamp black is the basis of nearly all black paint and is produced mostly by the burning of crude mineral oils, wastes from petroleum refineries, coal-tar oils and to some extent natural gas. The process in general is to burn the oil or gas at a low temperature with a limited supply of air and catch the "smoke" or lamp black in settling chambers in the flue.

Various colored paints are generally made from white lead and oil with the required amount of coloring pigment added. For marine use the pigment used should be one not affected by the weather or salt water. In general they are mineral or organic substances not soluble in water or oils. Many colored pigments are prepared by chemical precipitation but some are minerals or metallic salts ground to the required fineness.

High-gloss paints, or enamels, are generally made by using varnish in place of the oil and turpentine but some of the best wearing gloss marine whites and blacks are made by secret processes which cannot be described here.

All marine anti-fouling bottom paints we believe use some form of copper salt or metallic copper for the pigment. The manufacturers all regard the composition of their paints as a trade secret so no information is available on that subject, except that some use creosote, and it does not need a chemical analysis to prove it.

The anti-fouling properties of a paint seem to depend upon the fact that the paint is gradually dissolved and washed away by the action of the water, thus always presenting a fresh surface. Barnacles and other marine growths are in this way prevented from gaining a secure hold on the paint.

The color of the paint seems to have some bearing on its anti-fouling properties. As a rule the browns are most effective, the reds less so and the greens least of all. This is not true of all brands, as one of the most effective paints on the market is a bright green and another a bronze color.

From any angle, whether appearance, wearing qualities or economy, the question of which paint to use—the most satisfactory marine paints and varnishes for the motor boat owner are those put on the market by a manufacturer with a reputation to maintain. Probably this is true to a greater extent during these days of high prices and scarcity of materials than at any other time. The cost question is a great temptation to the manufacturer to use cheaper substitutes or adulterants, and to the boat owner to purchase cheaper brands of materials.

Sometimes perfectly good paint is condemned for its poor wearing qualities when the fault is entirely in the preparation of the surface on which it was applied. This also applies to varnish.

Paint and varnish will not adhere permanently to damp, oily, dirty or chalky surfaces. The entire surface to be covered should be sand-papered to remove all loose particles. Sometimes steel wool is more effective than sand-paper in removing loose scales of varnish or paint that is badly weathered.

Remember that flat yacht white, after a few months, is more of a chalky covering, ready to rub off at the lightest touch than an impervious, protecting film of dried oil and pigment. It is purposely made this way so that the boat can be kept clean by scrubbing, and every time it is scrubbed some of the paint washes off exposing a fresh white surface.

In the choice of marine varnish there is one important point to be considered. There are two general types of good marine varnish on the market. The first is thick-bodied and slow-drying and the second is thin-bodied and dries very fast. Sometimes an additional coat of the second variety is necessary to secure the desired effect. The owner should use his own judgment and be governed in his selection by the conditions under which the work is to be done.

After thoroughly cleaning the surface to be painted the next step is to be sure that it is dry—thoroughly dry—and that the wood beneath the paint already on is dry. You cannot make it stick permanently to a damp surface.

On motor boats especially, the paint and varnish is sometimes oily or greasy. This should be cleaned with gasoline if necessary, followed by a washing with water and some such cleaner as Gold Dust or Pearline. In fact, it is a good plan to wash all the painted surfaces with some cleaner. Cleaners should not be used on varnished work.

The bottom should have been thoroughly scrubbed, and scraped if necessary, when the boat was hauled out. After cleaning the bottom in the fall it is sometimes advisable to give it a coat of raw linseed oil. This tends to hold the copper pigment in place during the winter and keeps the planking from drying out too much. The use of a coat of red lead and oil in the fall is not advisable as it covers the copper paint already on the hull with a practically impervious paint film, and prevents the copper paint underneath from coming into contact with that which is applied in the spring, and consequently the effective thickness of copper paint on the hull is limited to that on top of the red lead.

To have the motor boat look its best, not only when in commission but during the entire season, it is just as important that the paint be properly applied as it is that the surface be in the right condition and that the best quality of materials are used.

Paint brushes may be secured at almost any price from ten cents up, but it will be found that the more expensive brushes are the cheapest in the end. A paint brush is like any other tool. When taken care of it can be used for several seasons, and give satisfactory results. The amateur is too apt to buy a fair brush, use it once or twice, leave it lying around until it dries out as stiff as a board, and then throw it away. If he had put his brush away in oil, it would have kept as good as new, and been ready for that next coat of paint. Aside from the use of good paint, it is absolutely necessary that a good brush be used in applying it if good results are to be obtained. A cheap, poor brush with soft bristles will spoil the appearance of any job, and use about one-half to two-thirds more paint.

In painting, remember that two thin coats of paint well brushed out will wear better and dry more quickly than one thick coat.

To sum up, the requirements to be met in giving a motor boat a good lasting finish of paint and varnish are, first, see that the surfaces to be treated are clean, smooth and dry; second, use only the best paints, varnishes and other materials; and third, use a good brush to spread the paint in thin coats.

PRIZE CONTEST IN QUESTIONS & ANSWERS

The Automobile vs. the Motor Boat

Some of the Reasons Why Life Afloat Is Preferred by Many to Eating Dust—A Comparison of the Pleasures, Cares and Expenses of the Two Forms of Sport

THE PRIZE CONTEST—Answers to the First Question in the November Issue

An Automobile Is a Servant While a Motor Boat Is a Pal

(The Prize-Winning Answer)

OWNING both an automobile and a motor boat, there is no question in my mind that I derive more pleasure from the boat than from the automobile.

In the first place the automobile is limited to six or seven guests while you can give pleasure to double this number in the average motor boat and as the old saying is "The more—the merrier."

The automobile is confined to narrow, dusty and frequently very rough roads upon which the driver must keep his eyes lest the machine be wrecked. On the motor boat there is so little restriction that the steersman may enjoy the outing as much as the passengers or guests as there is always some one along who is able to steer and give the owner relief. On the automobile the owner in most cases does all the work and gets the least pleasure.

Motoring in cities is mostly an irritation as the laws are numerous and traffic policemen seem to take a delight in "calling down the autoist" on the slightest provocation. The motor boat is very free to pursue its course in peace. The way is usually wide and dangers of accidents are slight.

At the end of long automobile trips the passengers are tired and dirty with dust, cramped from sitting so long in a confined space and glad to get home.

On the boat the passengers are free to move about, are not bothered with dust and have enjoyed the day so much that you can't drive them home. They want to remain all evening and enjoy the evening on the water far from the noise, dust and heat of the city.

An automobile is a servant while the motor boat is a pal of the owner and his friends, and is loved for itself alone. The automobile has only a number to distinguish it from thousands of other machines just like it but the motor boat is given a regular name and is usually so distinctive that it is as well known as the owner.

The average autoist is glad to leave the grooming of his machine to hired help but the motor boatman takes a keen joy in working about his boat and keeping it up in shipshape condition.

In the case of summer vacations the autoist tours about the country going mile after mile to find beautiful scenery while the motor boat is in the midst of pretty places all the time because where there are lakes or rivers there is interesting scenery.

The motorist after a day's trip must hunt for a garage and hotel and put up with what service he is able to obtain. The motor boatman takes his hotel with him and at nightfall has only to drop anchor or tie up and he is at home in his cozy cabin with all the conveniences of a home and at little or no expense above food and ice.

As far as danger is concerned you only need read the papers which are full of terrible accidents resulting from automobiles colliding, or running over little children playing in the street. Who ever heard of a motor boat hurting an innocent bystander. In fact you will have difficulty remembering when you have heard of a death resulting from use of motor boats.

The autoist can never know the delights of living aboard. The meals eaten out in the open. The early morning swims. The fishing trips and fish frys on sandy beaches. The long lazy days spent aboard just lying around and basking in the sun and drinking in good fresh air that you can't get while driving an automobile.

C. C. F., Chicago, Ill.

* * *

Motor Boating—A Better, Cleaner Sport

A LARGE majority of the men in this country can trace their ancestors to "The men who go down to the sea in ships." The heritage still lingers and it needs but a taste to awaken the instinct and the desire for a boat.

Small power boats have been in use since the development of the steam engine and boiler, but it is to the automobile industry that we owe the development of the gasoline engine, and, incidentally, motor boats as they are to-day.

Motor boating is a man's sport and the game cannot be learned in three lessons. There is always something to learn, and after the initiation there is a desire to know more. One may even build his own boat and thus know thoroughly every plank and bolt from stem to stern. The average automobilist knows how to steer, shift gears, and manipulate the controls.

There is not to be found a better, cleaner sport than motor boating. One who has ever cruised knows the genuine hospitality and friendship that exists among the fraternity. You are given the freedom of the clubhouse and grounds and there is no charge whatever.

Every man who owns a boat is willing, yes anxious, to help a brother in distress. Should you stop in mid-stream to make a few adjustments you will have to refuse several offers of assistance or a tow in, no matter whether you are a stranger or not and no

Questions for the February Issue

1. What are the principal advantages and disadvantages of a flexible coupling for the propellor shaft?

Suggested by L. R. L., Columbus, Ohio.

2. Describe and illustrate with sketches suitable arrangement for providing springs for extension berths.

Suggested by E. W. M., New York City.

3. Describe and illustrate, if necessary, any new improvements that you will add to your cruiser this winter for your convenience and comfort next season.

Suggested by L. R. K., Phila., Pa.

Rules for the Contest

Answers to the questions, addressed to the Editor of MoToR BoatinG, 119 West 40th St., New York, must be (*a*) in our hands on or before **January 21,** (*b*) about 500 words long, (*c*) written on one side of the paper only, (*d*) accompanied by the senders' names and addresses. (The name will be withheld and initials or a pseudonym used if this is desired.) Questions for the next contest should reach us on or before the **21st of January.** The Editor reserves the right to make such changes and corrections in the accepted answers as he may deem necessary.

The prizes are: For each of the best *answers* to the questions above, *any article or articles* sold by an advertiser advertising in the *current issue* of MoToR BoatinG of which the advertised price does not exceed $25, or a credit of $25 *on an article* which sells for more than that amount. (*There are three prizes—one for each question—and a contestant need send in an answer to but one if he does not care to answer all three.*)

For answers which we print that do not win a prize we pay space rates.

For each of the questions selected for use in the next contest, *any article or articles* sold by an advertiser advertising in *this issue* of MoToR BoatinG, of which the advertised price does not exceed $5, or a credit of $5 *on an article* which sells for more than that amount.

All details connected with the ordering of the prizes selected by the winners must be handled by us.

PRIZE CONTEST

reward is expected other than that you pass the favor along to some one in need.

Will you find the same feeling among automobilists? In a few cases, occasionally, a mechanic may stop and ask if he can be of any assistance, but generally a mishap that is not reparable on the road means a long wait for assistance from the garage.

When you go out in a boat you need not take everyone's dust. There is none. You cannot go too fast and jump a stone wall and there is no chance of some one coming up from behind or crowding too close while passing and wrecking you. You have the whole river or lake on which to pass, and there is just the remotest chance of another boat hitting you.

The dangers of motor boating are negligible when compared with automobiling. Read Monday's papers and note the number of automobile accidents. Did you notice any boating accidents? No. A boating accident is almost unheard of, and what few have occurred were the result of gross negligence on the part of the operator.

On a clean boat, and they should all be clean, there is practically no danger from fire, and even an 18-footer will stand an enormous amount of bad weather without danger.

The automobilist will argue that you cannot go to so many places or use your boat as long. True. But many own boats, and a fast runabout approaches the motor car in going between towns to business. Ask the Long Islander which is the quickest way to New York.

An automobile costs from $700 to $3,000 and depreciates fifty per cent. the first year. A motor boat costing the same is generally better the second year, depreciating but little and will last twenty years with a little repairing.

The upkeep for the first five years should be nothing, except for hauling out, painting and overhauling the motor. There are club dues but no garage rent. The fuel consumption is a little more, but that is more than offset by the cost of tires and repair bills.

Motor boating at slow speeds is decidedly a game for the man of moderate means, one that he can play right and enjoy just as fully as the millionaire. Yes! More so, because he works around and understands the outfit and does not trust to some one else to do for him.

Here's to motor boating, the better, cleaner sport. May it long endure and prosper.

W. B. M.,
Newburgh, N. Y.

* * *

A Comparison of Expenditures

"WHY don't you get a car?" is the question which has been put to me dozens of times by friends with cars and without, who seem to have no conception of the pleasures of boating. But the question is never asked by those whom I have had off for even one good day's trip on the boat, and a comparison of the merits of the two should readily show the reason.

In purely creature comforts the car cannot possibly hold its own against the comparatively roomy boat, with the clean, fresh air that is found on the water. You may take your choice of an easy chair in the shaded cockpit, a sunny deck to stretch upon, or even a comfortable berth in the cabin for a nap. The longest car on any but perfect roads cannot rival the easy motion of a boat over the waves. A luncheon can be quickly conjured from the depths of any well-appointed boat's larder and the keen air will give more zest to the dinner prepared on a two- or three-burner alcohol stove, (plus the aid of the ice-box) than a dusty ride to the best cuisine of a roadhouse. And do not forget that the luxury of a swim is always at hand.

Then there is the convenience that comes from always having your own hotel with you and the ability to stay as long as you like at the place that pleases you, irrespective of the possibly crowded hotels. There are no exorbitant hotel charges to spoil the trip for those who like to get somewhere near the value for their money.

Far from the least is the much greater economy of the boat over the car. My boat is a 25-foot raised-deck cruiser, well arranged and equipped. A year ago I kept a very careful account of my expenses and the total was just under $150 for the season. This included the spring overhauling and engine repairs, considerable new equipment, club dues, winter storage and all gasoline, oil, etc., everything in fact but the foodstuffs which were the same that we should have had at home.

From this sum I received the following benefits: many evening or moonlight trips, usually with refreshments after, jolly evenings all; either a Sunday or week-end trip every week all summer, sometimes a day under the Palisades, or out for a clean ocean swim, a run around Staten Island, or perhaps a few days along the Shrewsbury or up the Sound, always with several good friends and, best of all, a corking two weeks' vacation spent carefree along the Hudson River, on which my wife and I were accompanied by another young married couple, the girls "bunking" in the cabin and "Bob" and I in hammocks under the tight cockpit awnings. The expense beyond the gas and oil already accounted for was less than $30 per couple and we all voted the trip better than any $150 vacation we possibly could have had. "Measure your pleasure by the hour, not by the mile."

The larger first cost of a good boat is more than offset by the difference in depreciation. A car more than three years old is *passe,* while a boat ten years old is often as smart and staunch as a new one and numerous boats fifteen to twenty years old are giving perfect service.

The car can be used more, of course. It can usually be kept nearer to the owner's home and can be used earlier and later in the season, or all winter, although hardly for pleasure then. It is in fact a great convenience, a sort of private trolley car and ranks with other conveniences of the age but in nowise can it compare with a boat for near or far pleasures.

And are we to forget the romance of the seas? The automobile, mechanical marvel, the ultra-modern convenience, touring the smoothest modern roads, with a garage every few miles, has lost all the spirit of the old coaching days, or even of the horse and carriage of yesterday. But the boat is heir to all the mystery of the sea. Every craft recalls the romance of the water, from the boats of the vikings to the still useful schooners of yesterday. I shall always remember, when, first possessed of a boat large enough for cruising, we left Hell Gate behind us and on a lazy summer day watched the ever-broadening vista of the Sound slip by us. I felt that thrill that I had scarcely known since the adventurous days of childhood. Charts we had, to be sure, but they seemed to give but suggestion of the dangerous rocks and shoals to be encountered, adverse currents to be overcome and snug harbors to be explored.

Of all things modern, the boat alone has retained to any great measure the charm of the past.

J. S. L.,
Bayonne, N. J.

The Opinion of One Who Owns Neither But Enjoys Both

IN comparing the relative merits of the automobile and the motor boat as a source of pleasure, it is particularly difficult for anyone to get a broad view of the situation, which is not directly and very strongly biased by reason of his own peculiar tastes, environment, and locality, but I believe I am particularly well fitted to pass on this question because I am not the owner of an automobile, neither am I the possessor of a motor boat. I nevertheless have frequently been driven throughout very beautiful parts of Long Island, Westchester County, and New Jersey, in an automobile, and have from time to time been pleasurably entertained by my motor boat friends.

To illustrate the question of environment: I know a man whose house is only a stone's throw from a yacht club on the Hudson and whose motor boat is readily available at any time of the day or night. The boat itself is a mighty comfortable and fast boat, and is great for two or three day cruises. On the other hand, he drives a small car of moderate power and keeps it in a garage more than a mile away from home. There is always a considerable inertia to be overcome in getting started on an automobile trip under these conditions.

Of course, if a fellow has a good automobile immediately available in his own home garage and has a small boat with an outboard motor, which he cannot start, tied at some remote and unavailable dock, it's different, isn't it?

To a man like myself the motor boat is certainly a dandy sport on beautiful days when the Sound is blue and the breeze is refreshing. When I have just come in from a trip of this kind I have the feeling that the motor boat beats the auto forty ways.

But when a friend drives up in an easy-running bus and drives the family up and down hill, over beautiful roads through woods, where we have glimpses of the water with a chance to stop under the trees for a picnic lunch and return to your own door step—I turn over in my mind the fact that the automobile is available not less than eight months of the year, and is a great source of convenience, often combining pleasure with business and is lots of comfort anyhow.

Automobile drivers say they are frequently able to buy supplies direct from farmers, or from cash stores, perhaps at no great saving, if the price of gasoline is considered, but by combining a considerable pleasure with a little business, the results are very satisfying and you have the good stuff in your cold cellar which is some item nowadays.

One of the great, big factors as it appears to an outsider to the motor boat game, is the necessity of hauling the boat out of the water every year, usually taking the engine out, and having it overhauled, in addition to painting and the like.

What's the matter with the automobile in your own garage and the motor boat tied to your own club dock. This seems to be the ideal combination if a fellow has the price and in the final analysis there is no real comparison between the two because they are so different and one is attractive one day and the other, the next. One is available to one man and not at all to the other.

DEACON,
New York, N. Y.

PRIZE CONTEST

How to Mark the Waterline

The Only Sure Way Is to Mark the Boat While It Is in the Water—Computing the Displacement No Job for the Average Motor Boatman

THE PRIZE CONTEST—Answers to the Second Question in the November Issue

Mark the Waterline While the Boat is in the Water

(The Prize-Winning Answer)

AN uneven waterline, poorly located, undoubtedly detracts more from a boat's appearance than any other fault outside of the design and the construction. It is quite some job for a naval architect to figure out the weight of the hull complete and the distribution of weights and then compute the exact depth to which the stem and stern will submerge.

The most practical method for the novice is to paint the hull all white or grey and put it overboard, with the motor and all fittings aboard and the tanks filled, and getting in a rowboat mark the waterline on the stem and stern and a couple of places on each side to check up to; or the boat may be left in the water until the waterline shows plainly. Then haul out and spot the line about three inches above the actual waterline. This allows a green or red stripe next to the water which will not show dirt nearly so plainly as white paint, and the green or red next to the water looks decidedly better than if it came only to the surface.

To strike the waterline, block up the boat so that the stem is plumb. Elevation of bow or stern is of no account. Plumb the stem and stern with a plumb-bob and do not try to use a spirit level against the side. If the boat is not properly faired and cannot be made to plumb fore and aft, you will have to give and take a little.

After the boat is plumb and level, tack a straight edge 8 or 10 feet long to the stem, its upper edge 3 inches more or less above the actual water mark. This straight edge must be carefully leveled and kept so throughout the whole job.

Stakes may be driven in the ground or tacked to the skids as convenient and the straight edge held in position by clamping to the stakes.

Tack a similar straight edge to the stern and level and fasten in the same manner. After both straight edges are set, check the leveling to be sure that they have not shifted, and see that they or the boat do not shift afterwards.

Get a couple of friends to help and let them stretch a chalk line taut over the upper edge of the boards, allowing it to just touch the hull. By moving the ends of the line it may be made to touch every spot in a straight line along the side of the hull.

Beginning at one end, hold the line so that it touches about a foot from that end and at the under side of the line where it touches the hull, drive in a brad, and continue moving the line so as to place the brads a foot apart all along the side. Where the hull curves under care is necessary to prevent the line from slipping down along the side.

After the brads are set take a long batten about ¼ by 1 inch and tack it to the hull so that it just touches the under side of the brads. A batten this size sprung flat will strike a fairer line than a narrower or square strip, or the same batten sprung on edge. Should any unfairness be noticed, carefully check the work. When standing off and looking at the boat broadside, the batten should appear as a straight line fore and aft.

When the work is right, remove the brads from the hull and with a narrow race knife or the sharpened tang of a file score in the line from 1/32 to 1/16 inch deep. This gives a line that is easy to paint up to and which cannot be lost by painting over.

W. B. M.,
Newburgh, N. Y.

Computing the Displacement No Job for an Amateur

THERE is a way to determine the waterline of a boat or cruiser before she is launched, but I should not advise the average amateur to use it. First he must find out how much his boat weighs complete with the engine installed and all fittings, provisions and crew aboard. He must then have the volume of that part of the boat below the waterline, taken in cubic feet, just so much that when multiplied by the weight of one cubic foot of water (salt water weighs 64 pounds to the cubic foot, fresh water, 62½ pounds), it will just be equal to the weight of the complete boat.

He must then determine the center of gravity. It must be exactly the same vertical line as the center of buoyancy. However that may be, the average amateur will see by now that he had better put his boat in the water to find the waterline at the bow and stern.

About painting the waterline, I find that the proper way to do this is to hang a plumb-bob from the stern or bow and block the boat up until the bob hangs straight with the stem, showing the boat is plumb, then get two straight-edged battens about twice or more the length of the width of the boat. Put up two posts or stakes at each end of the boat, a little higher than you want the waterline. Then tack your battens to these stakes, but be sure your battens are perfectly level and the right height for the waterline. Then you can draw a line to different parts of the hull along these battens and mark where the line touches the boat.

J. K.,
Sarasota, Fla.

A Hinged Clutch Lever

Every Installation Presents a Different Problem in the Arrangement of the Levers and Rods —The Simplest Scheme Is Generally the Most Satisfactory

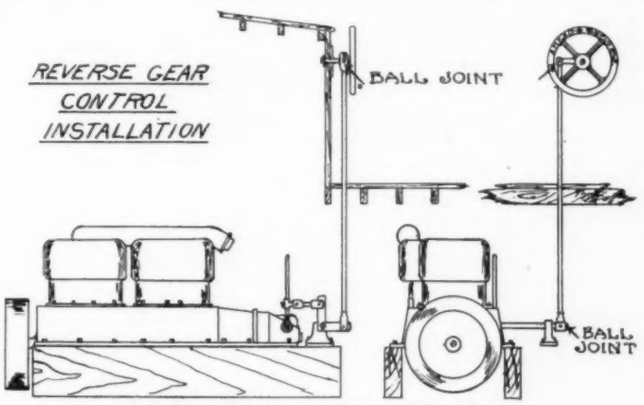
THE PRIZE CONTEST—Answers to the Third Question in the November Issue

A Well-Designed Control

(The Prize-Winning Answer)

THE clutch control shown in the drawing, which is practically self-explanatory, is designed to attach to the cabin bulkhead within easy reach of the steering wheel. The vertical control column extends through the cockpit flooring and is connected to the reverse or clutch handle by means of levers and connecting rods fastened to the under side of the floor beams.

While the operating handle is arranged to fold down against the control column, the design is such that it is held rigidly in the horizontal position while in use



W. B. M.—A wheel is substituted for the lever

—a detail which will be appreciated when maneuvering in close quarters as the handle will not fall to its folded position every time it is let go in order to adjust the throttle control, spark, or lend two hands to the steering wheel. The handle is made as shown in sketch of malleable iron or brass (if malleable iron parts are used they may be galvanized) and is made to slip through the handle socket from back to front when assembling. It is prevented from coming all the way through by the small lugs on back end of the handle. which lugs fit in grooves in the socket, allowing the handle, when pulled forward, to swing down (using the lugs as hinge pins) against the vertical column.

PRIZE CONTEST

When it is desired to lock the handle in horizontal position, it is first raised to that position, then pushed back into the handle socket which it snugly fits, the small ⅜-inch tap bolt acting as a stop to prevent handle pushing completely through the socket. (See detail of handle.)

The arm socket is keyed and set-screwed to the 1-inch diameter, control column. This column is attached to the bulkhead by means of the bearings shown in the drawing.

The lever at bottom of control column is beneath the cockpit floor and is also detailed in the sketch. It is keyed and set-screwed to the column.

The remaining links or connecting rods and levers are bent bar steel ⅜ inch thick by 1½ inches wide with jaws formed by riveting or bolting bent pieces of the same material to them, and need no further detailing than the perspective assembly of the control shows. The fulcrum upon which the main lever turns is detailed and is also bent bar steel with a shoulder bolt fitted to it.

The end of the main lever must be supported to prevent it from sagging under its own weight. A bracket of wood or steel should be fastened to the floor beams upon which this lever may slide to the full extent of its motion.

In some instances where the reverse handle is set considerably off the center line of the motor, it may be possible to connect the lever at bottom of column directly to it, by means of a link, thereby eliminating the main lever, fulcrum, and bent or twisted connecting links, however, the majority of installations will require the arrangement shown in the sketch.

While the scheme will remain the same, dimensions of levers, etc., will have to be worked out for each particular boat, so as to give the necessary amount of movement to the reverse or clutch lever, also to fit local conditions. For this reason no lengths of levers or connecting rods are given in the drawing. Pins or bolts connecting jaws to levers and rods should be fairly snugly fit—otherwise they will rattle with the vibration of the motor, and cause considerable annoyance.

W. E. M.,
Philadelphia, Pa.

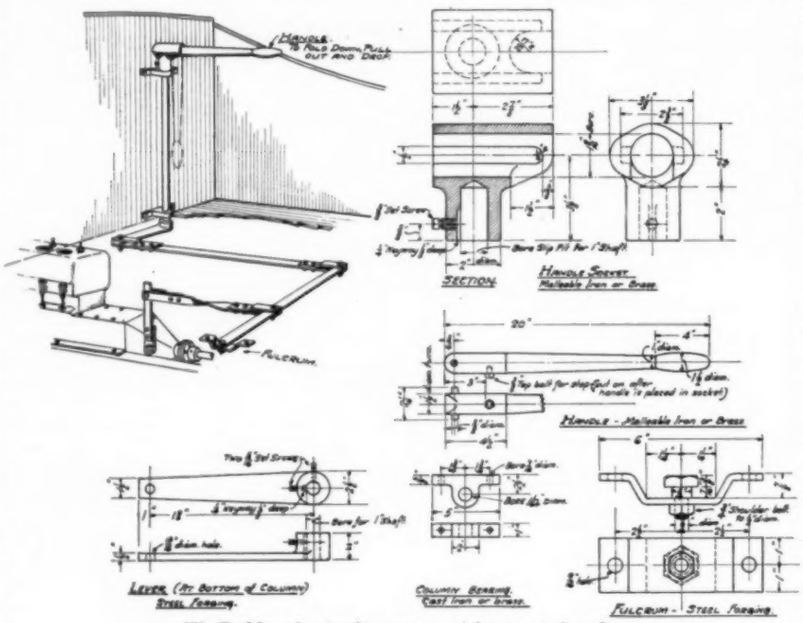
* * *

A Geared Control Requiring Very Little Room Under the Deck

THE column is located to the right of the steering wheel, so that the lever can be easily manipulated with the right hand.

The lever or handle is a piece of 1-inch steel shaft, flattened to ¾ inch by 1 inch at one end, to which two short pieces, ¼ by 1 inch, are fastened with rivets, forming a forked end, which fits the upper end of the vertical shaft. Two rivets are placed at this end when it is assembled to the vertical shaft, one as a hinge pin through the slotted hole, and one fitting the notch. The slot is long enough to let this rivet clear the notch when the handle is pulled out and allowed to drop down. The handle, of course, is not riveted tight, but has about as much looseness as a stiff hinge. The other end of the handle is fitted with a rubber motor cycle grip.

There are four brass bearings required, all alike, two for the vertical shaft, and two for the horizontal shaft. These are bored for 1 inch shaft, and have two holes for the fastenings.



W. E. M.—A simple system of levers and rods

The vertical shaft is 1 inch, with a sharp bend at the top, the bent part being flattened to 1 by ¾ inch, and has the slotted hole and notch as shown. A collar is fastened to the shaft at this end, resting on the bearing. Where the shaft passes through the floor, water is prevented from getting in by a flanged collar, or a brass flag pole socket open both ends. The lower bearing is fastened flush with the lower edge of the floor beam, and that part of the shaft projecting below is keyseated for ¼-inch key, holding the mitre gear, which is also set-screwed. This gear also acts as a collar for the lower end of the shaft.

The mate to this gear is fastened to the horizontal shaft in the same manner as above, and the bearings are bolted to fore and aft pieces fastened to the under side of two floor beams. A collar at the opposite end to the gear keeps this shaft in place. This end is bent down, flattened and drilled for ½-inch bolt for holding the bar connecting to the reverse lever, on the gear.

The mitre gears are 4-inch pitch diameter bored for 1-inch shaft, with ¼-inch key seat and set-screw.

When laying out this arrangement, some changes may have to be made to adapt it to another boat, but first determine the movement at a point on the gear lever where a connecting rod can be attached, and arrange the rest of the system to suit this movement.

As sketched, the gear is set forward, 30 degrees out being neutral, and about 60 degrees out being reverse; the handle, of course, can be dropped down at any point.

L. R. K.
Philadelphia, Pa.

Uses a Wheel in Place of a Lever

A REVERSE gear on a cruiser is not a luxury. It is a positive necessity, and a sure method of handling the gear is imperative. On many of the smaller cruisers the gear is handled by means of a long lever, projecting up through the cockpit floor; and so attached that it may be removed and set aside until needed. This gets the lever out of the way. But, how about an emergency? A means of handling the reverse gear can be worked out so that the control may be placed within easy reach of the steering wheel.

This scheme has been worked out on the above lines. The reverse gear lever is connected to a bell-crank arrangement by means of rods and fittings. The bell crank is connected in the same manner to a vertical wheel on the cabin bulkhead. The wheel may be placed directly ahead of the steering wheel, or at one side.

No definite instructions for the construction and connecting up can be given as every boat is a little different and no two reverse gears are alike, but the same general plans will apply to all installations.

With an outfit where the motor is in the cabin, ahead of the steering position, the installation is easy. A forged clip is made to slide on the reverse gear and clamp securely with bolts. One end is longer and so shaped as to fit into standard, malleable, awning-jaw tips.

An arrangement similar to a bell-crank but having a long axle or shaft is constructed from an iron rod squared on a taper at the ends and threaded for a nut to hold the cranks on. The cranks may be cut from heavy plate or, better, forged. The length of the levers should be approximately the distance from the center of the reverse gear lever fastening to the clip on the handle. The cranks are set at 90 degrees so as to change the motion.

The length of the axle is the athwartship distance from the reverse lever to directly under the controlling wheel and it is fastened below deck so that the levers will pull in a straight line or nearly so. Two collars held by set-screws will hold the shaft from working sidewise out of position.

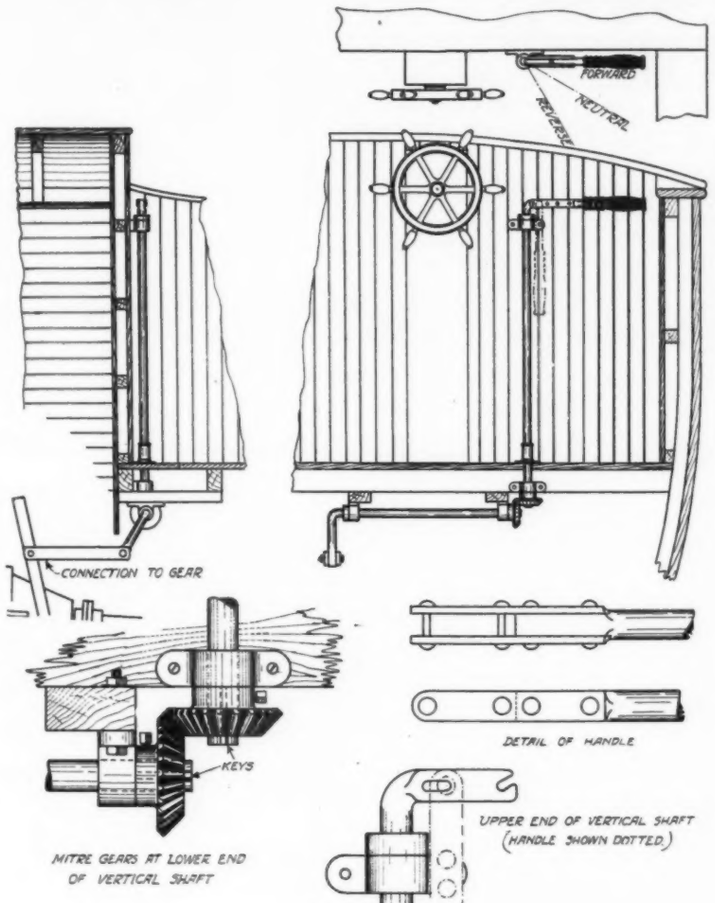
The control wheel may be of the automobile type or a spoke wheel, according to your fancy. It may be located directly ahead of the steering wheel by fitting a longer bearing pin which will carry both wheels or it may be set to the side of the steering wheel.

The connection to the wheel may be fastened directly to a spoke or to a plate fastened between the hub and rim ahead of a spoke.

Connect the clevis on the gear handle to the crank with ¾-inch galvanized pipe and awning jaw tips.

The proper distance from the center of the wheel fasten a ball joint similar to those used at the steering knuckle on automobiles, and

PRIZE CONTEST



L. R. K.—A gear control requiring very little space under the cockpit floor

A Simple Control

THE installation of a clutch control varies somewhat as to the conditions under which it is necessary to install it, owing to the various types of clutches and the desired location in respect to the engine. In the accompanying sketches I have endeavored to show simple arrangements of such a control, which may be adapted to the various conditions that may be encountered.

The design while simple is positive in its action and contains no intricate or expensive parts that are liable to get out of order when needed most.

The column should be of brass squared on the ends as shown to receive the control handle hinge and lower lever.

The handle hinge and lever are brass castings, patterns of which are easily made by anyone handy with tools. The connecting rod and flat bar are of iron and of lengths to suit conditions of actual use.

Bolts used for conducting the various parts should have two nuts to prevent working loose when in use.

The length of the control handle and lever should be proportioned to the amount of throw necessary to operate the clutch; the longer the lower lever, the shorter the forward and backward movement of the control handle.

The handle and hinge have been designed to give the greatest amount of strength at what is usually the weakest part of such an outfit, and does away with spring catches and pins to hold the handle in place when in use. The handle may be instantly removed by sliding it off the column and stowed away when the boat is not in use.

Having obtained a comprehensive idea of the principle employed in transmitting the pressure to the clutch, the average person with a little study readily can adapt the same to his own particular requirements.

T. P. K.,
New York, N. Y.

use the same joint at the crank lever, connecting them with galvanized pipe or rod. Where connected the crank must be horizontal and the wheel lever horizontal.

For high-power engines and large reverse gears, or where the reverse gear lever is located at a considerable horizontal distance from the bell-crank at the bottom of the vertical rod, it will be necessary to use a heavier construction than ⅜-inch pipe fittings. For such cases either a ⅜ by 1½-inch iron bar or 1-inch pipe should be used between the reverse gear and bell-crank, and a ⅝-inch round iron rod from the wheel on deck to the bell-crank, with guides to prevent buckling if necessary. Standard clevises can be obtained at supply houses for the various sized round rods, which make a neat and satisfactory connection.

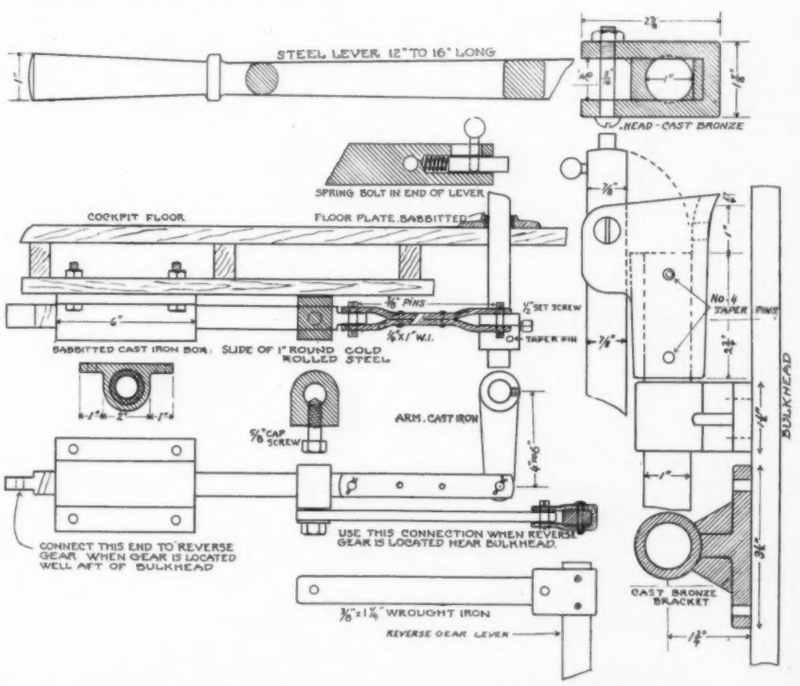
Adjustment may be made by raising or lowering the clip on the gear lever and turning up or out a thread on the connections.

After you have tried out the control and know just where the neutral position is, make a spring catch that will drop into a notch having slanting sides, so that a pressure either way will disengage the catch. This will always indicate the neutral position and the clutch will not work out.

It might be advisable to mark the wheel rim with arrows showing the directions for ahead and astern.

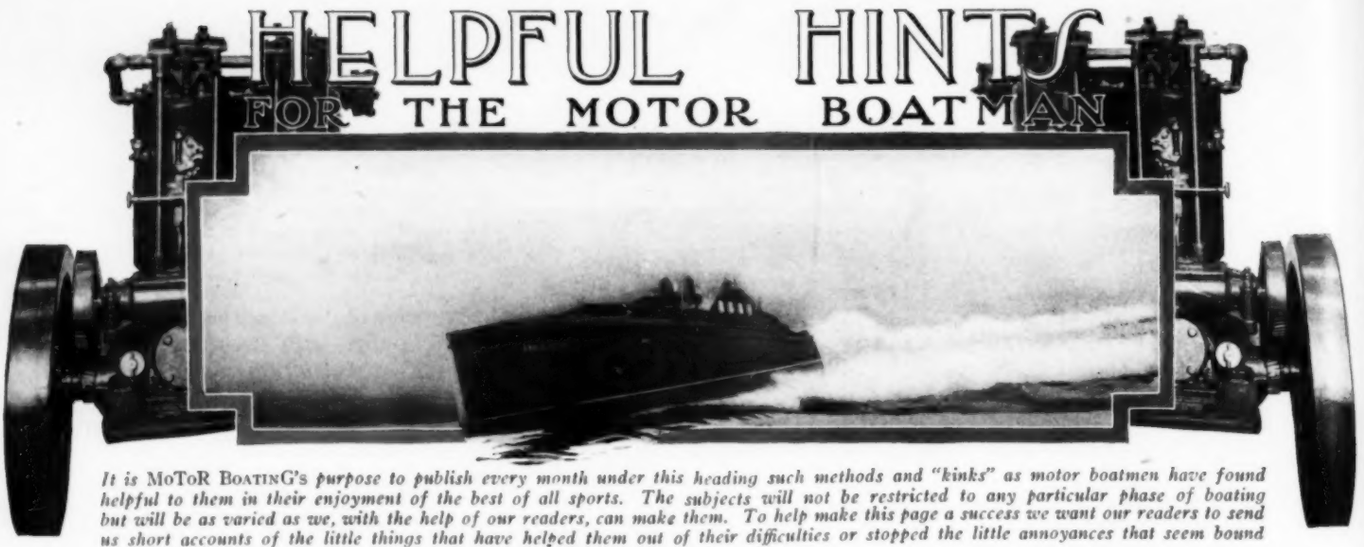
A few drops of oil occasionally is all the attention required and the outfit will give no trouble.

W. B. M.,
Newburgh, N. Y.

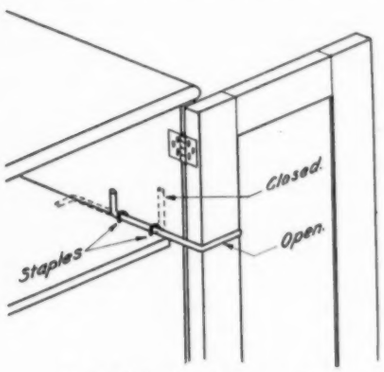

STEEL LEVER 12" TO 16" LONG
HEAD - CAST BRONZE
SPRING BOLT IN END OF LEVER
COCKPIT FLOOR
FLOOR PLATE BABBITTED
⅜" PINS
⅜" SET SCREW
6"
BABBITTED CAST IRON BOX
SLIDE OF 1" ROUND COLD ROLLED STEEL
⅜"x1" W.I.
TAPER PIN
No. 4 TAPER PINS
BULKHEAD
5/8" CAP 7/8 SCREW
ARM. CAST IRON
CONNECT THIS END TO REVERSE GEAR WHEN GEAR IS LOCATED WELL AFT OF BULKHEAD
USE THIS CONNECTION WHEN REVERSE GEAR IS LOCATED NEAR BULKHEAD
⅜"x1¼" WROUGHT IRON
REVERSE GEAR LEVER
CAST BRONZE BRACKET

T. P. K.—Somewhat different from the usual levers and rods

HELPFUL HINTS FOR THE MOTOR BOATMAN



It is MoToR BoatinG's *purpose to publish every month under this heading such methods and "kinks" as motor boatmen have found helpful to them in their enjoyment of the best of all sports. The subjects will not be restricted to any particular phase of boating but will be as varied as we, with the help of our readers, can make them. To help make this page a success we want our readers to send us short accounts of the little things that have helped them out of their difficulties or stopped the little annoyances that seem bound to occur every so often.*—Editor.



To hold cupboard doors open

Wire Holders to Keep Cabinet Doors Open

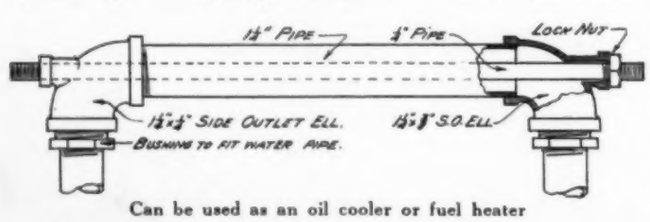
Doors of cabinets often have the annoying tendency to swing shut when articles are being removed from the shelves. This can be overcome by fitting brackets of No. 9 gauge galvanized iron wire into the sides of the cabinet, the wire being bent to the shape shown in the sketch and held in place by galvanized iron staples. When the doors are to be held open the wires are slid forward from the original position, as indicated by the dotted line, and set in front of the doors. Before the doors are closed the wires are quickly snapped back into place.

To Cool the Lubricating Oil or Heat the Fuel

A great deal of the smoke given off by some marine motors is caused by the lubricating oil in the base becoming too hot. This is especially true of motors lubricated by the splash or pressure system where the oil is caught in a sump and pumped back through the motor.

A cooler constructed of iron pipe and fittings as shown in the sketch and connected into the water supply piping and the oil pipe cut in between the pump and the point at which it reenters the motor will reduce the temperature of the oil sufficiently to prevent the smoking.

This style of cooler can also be used as a fuel heater by connecting it up in such a manner that the hot water from the cooling system will pass through it.



Can be used as an oil cooler or fuel heater

Winter Care of Cork Carbureter Floats

Much difficulty in getting the motor in good running order in the spring sometimes is caused by the cork float being left in the carbureter all winter. This trouble can be anticipated and overcome by taking the float out in the Fall, soaking it in alcohol until all traces of shellac can be wiped off, then putting the float in a dry place for several days.

After the float is thoroughly dry, give it two or three thin coats of good shellac dissolved in pure grain alcohol.

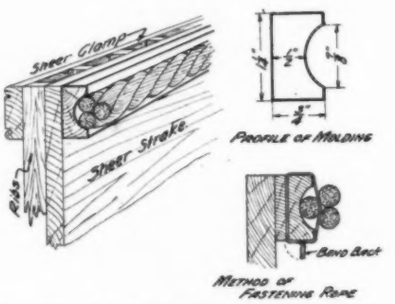
The float will then have the buoyancy the manufacturers intended and will control the level of the gasoline in the float chamber so that the proper amount will be drawn through the spray nozzle.

A deviation card somewhat out of the ordinary

An Ornamental Deviation Card

The illustration shows a unique form of deviation card which is ornamental as well as useful. The outer rose is graduated into compass points and degrees, and is used for the magnetic course, while the inner rose is graduated into points whose location, relative to the corresponding points on the outer rose, varies according to the deviation for that particular point. In other words, the deviation is shown by the angular distance between the corresponding points on the inner and outer roses.

The deviation as shown on this particular card was determined by anchoring the boat in a known location and reading the angle with a sextant between the axis of the boat and an imaginary line joining the observer and prominent land marks shown on the government chart.



A molding for the dinghey to hold the fender rope in place

Molding for Fender Rope

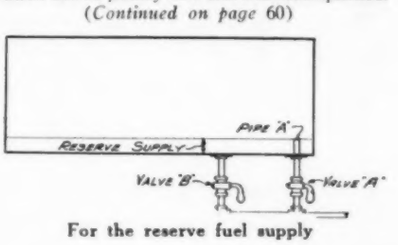
The molding shown in the illustration has proved satisfactory in keeping the fender ropes in place on the dinghey. The dimensions given are suitable for ⅞ or 1-inch rope.

The molding should be made from oak or mahogany and fastened by long screws through into the sheer clamp. The fender rope can be secured to the molding by loops of No. 12-gauge brass wire spaced about 8 inches apart.

A Reserve Fuel Supply

Every motor boatman has at some time been confronted with the problem of providing a reserve fuel supply for the motor. Sometimes this is accomplished on large boats by installing a separate tank, but in smaller boats this is usually impractical for lack of convenient space. Many owners of small craft try to overcome this by having a dangerous can of gasoline in the cockpit or lockers. For lack of space and because of a desire to rid the cockpit of the dangerous gasolene can a scheme was devised to make the supply tank act in the double role of main and reserve tank. The illustration shows plainly how this was accomplished.

(*Continued on page* 60)

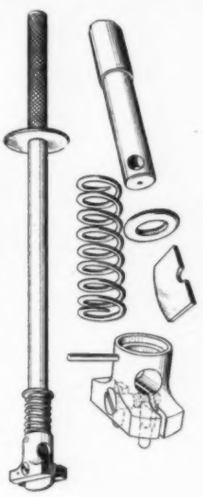


For the reserve fuel supply

New Things For MOTOR BOATMEN

[Each month many new parts, attachments and fittings, interesting and invaluable to owners of large and small motor boats, are added to the devices already on the market. Announcements of these articles come to us in such numbers that in order to introduce all of them to our readers we have been obliged to omit descriptions and publish only illustrations with short explanatory captions. In doing this, however, we urgently invite our readers to write us for complete information, as we shall take the greatest pleasure in providing it, together with the manufacturers' names and addresses. Do not hesitate to ask us, as we have made special arrangements to take care of this branch of our correspondence and are able to give you accurate information with the greatest promptness.—Editor.]

This carbureter is provided with separate float feed valves for gasoline and kerosene. After passing the metering jet, the kerosene and a small amount of air pass through a heating coil placed around the exhaust pipe. The vaporized fuel thus obtained is then mixed with the proper amount of air and enters the intake manifold

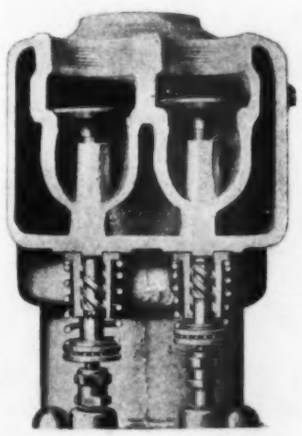


A valve-grinding tool with a universal joint which allows the working and a certain amount of motion in any direction relative to the shank. This allows the valve to remain in contact with the seat at all times and ensures an even and true contact

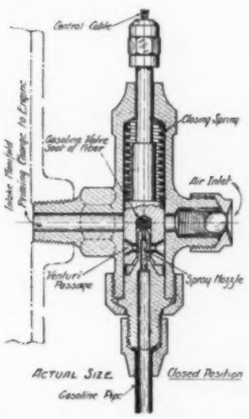
The device shown above can be attached to any carbureter and heats the fuel by the use of hot water from the cooling system. This heater is useful particularly during the cold weather, and when low-grade fuel is used

A compression coupling for brass or copper tubing which grips the tube in two places. It is claimed that the joint will remain tight under the most severe conditions. It is manufactured in all the patterns generally used in fitting up tubing

This gauge will indicate the amount of gasoline in the tank and can be read in the dark. When not in use the gauge rod is held inside the tank by a latch on the cap



The device shown above causes the valves to rotate every time they are raised and bring different portions of the valve and seat into contact, thus avoiding uneven wear



A new form of priming valve to be attached to the intake manifold and operated by a cable from any convenient point. This primer is so designed that the gasoline is injected in the form of a fine spray

An angular ball bearing with two-part raceways which can be applied to the inside bearings of the crankshaft or other bearing over which the ordinary form of raceway cannot be slipped. It is claimed that the balls will not pound when passing over the joint in the raceways

Do not fail to write to the editor if you desire information concerning any of the above new things

The Why Not of the Automobile Engine

A Few Arguments and Reasons Against the Use of the Automobile Motor in a Boat—What Service on the Water Demands of the Ideal Power Plant

FROM discussions overheard at various yacht clubs from time to time and from the many letters received by the boating publications, there seems to be a general lack of appreciation of the differences in design and the conditions under which the marine and automobile motors are supposed to operate satisfactorily and economically. To some motor boatmen they are simply engines to run on gasoline and can be put to any use.

This is far from the facts in the case. The automobile motor is designed for its special work and conditions. In driving a car, the throttle hardly ever is left open to the limit and when it is opened wide it is only for a few minutes at a time. Thus it is seen that the automobile motor is seldom called upon to deliver its maximum power and then for only a short spurt. Running under these conditions, the charge of gas drawn into the cylinder each time is only part of what could be used were the throttle wide open. Naturally this limited charge of gas does not create as high a pressure in the cylinder as a full charge, and, in turn, the force exerted through the connecting rod to the crank shaft is also reduced.

With the marine motor the operating conditions are much more severe. Nearly every marine motor is run with the throttle wide open, and delivering the maximum power for over 90 per cent. of the time the boat is under way. To meet these conditions every part of the marine motor must stand up under the maximum load or stress for any length of time that the owner may wish to sail. Then, too, there is the additional strain on the motor when running in a heavy sea.

The nearest comparison of the work the two types are required to perform would be that of running an automobile up a steep grade "on high" for the entire time that it is in use.

Of all the difficulties encountered by those who try to use an automobile motor in a boat the one which occurs first is, nine times out of ten, burned out crank pin or main bearings. Generally this is laid to lack of oil in the bearings, or a failure of the lubricating system. Sometimes this is true, but generally the real cause is the size of the bearing. Babbitt, or even bronze bearings, will stand up to the work required of them only while the pressure between the two bearing surfaces is kept below certain limits. The one critical condition is that the pressure be not great enough to squeeze out the film of oil and let the two metallic surfaces come in contact. Just as soon as the film of oil is broken the bearing will heat up and it is only a question of minutes before the babbitt will be softened and then broken.

Another difficulty with some automobile motors is that main bearings are provided only at the ends of the crank shaft. When subjected to the heavier, continuous load (increased piston pressure) of marine work, the crank shaft is sprung out of line. This will deform the main bearings and in a short time wear them out and sometimes the pressure will be sufficient to break the film of oil, allowing the bearing to heat up and burn out. For marine service there should be a main bearing at least between every pair of crank pins, for heavy service between every two cranks.

Automobile motors are designed to operate the greater part of the time with the crank shaft level or nearly so. Marine motors are as a rule installed on an incline, sometimes as much as 10 degrees. Naturally it follows that when an automobile motor is installed in a boat some provision must be made to keep the oil from running to the low end of the base, leaving the high end dry. In motors depending upon the splash system of lubrication such a condition would cause serious trouble with the bearings in a very short time.

A great many automobile motors are designed to run at a much higher speed than is desirable in a boat, so the timing of the ignition and valves must be adapted to the slower speed. With some forms of cam shafts this is a difficult thing to accomplish successfully. This is especially true where the inlet and exhaust valve cams are integral on one cam shaft. When the speed is reduced to any extent, generally it is necessary to reduce the compression accordingly.

The flywheel of an automobile motor is usually at the cultch end and as a rule must be placed at the forward end when installed in a boat. Under these conditions it is sometimes a very difficult job to connect the crank shaft with a clutch or propeller shaft in such a manner that the coupling will transmit the full power of the motor without failure.

Another difficulty experienced with automobile motors is that the flywheel is too light for marine service. When the flywheel is too light the motor will stall when the clutch is thrown in, which under the best conditions is annoying and at times dangerous.

The cooling systems of the automobile and marine motor are the same in principle, but vary considerably in detail. In the automobile, the radiator and water jackets of the engine are at the same level, and connected with a minimum of piping. Under these conditions the water will circulate itself as in the thermo-syphon system, but in some makes of cars a small pump is used to insure proper circulation. There is also a continual supply of cool air passing in through the radiator and past the engine, which is a great help in keeping the motor cool.

When a motor is installed in a boat there is always several feet of water intake and outlet piping with the necessary fittings. The water jackets as a rule are considerably above the waterline, and at least some of the water is discharged into the muffler or exhaust pipe against the pressure of the exhaust gases. The water used is not always free from grit and other impurities which interfere with the circulation.

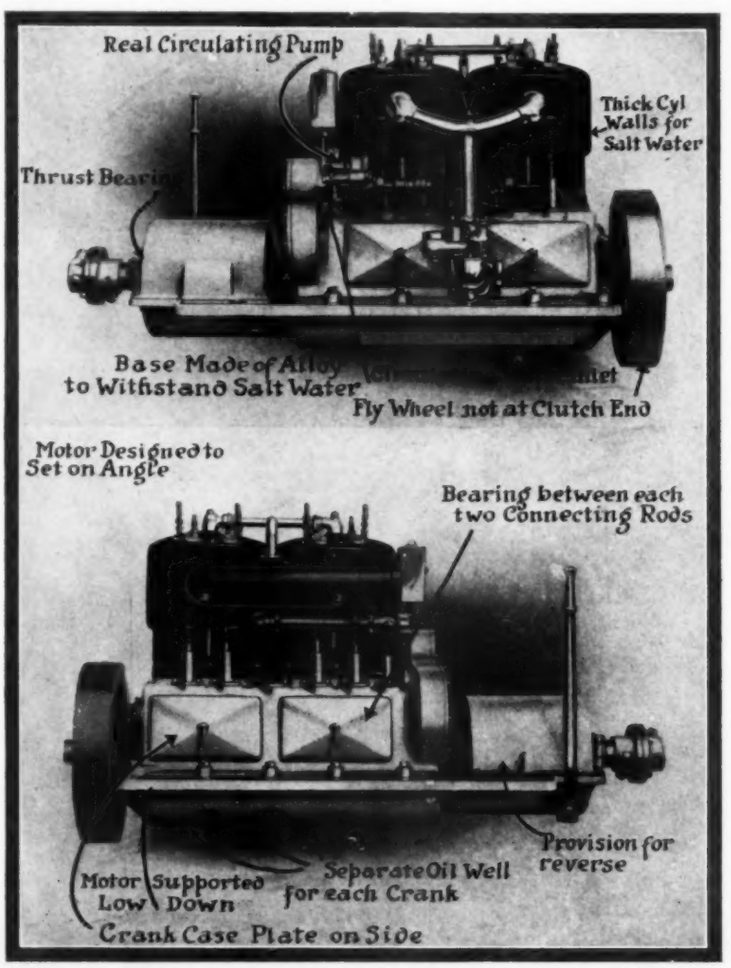
Under these conditions it is easily seen that the little rotary circulating pump supplied with an automobile motor is hopelessly incapable of meeting the requirements of marine service, and will sooner or later fail. When a motor boat is used in water containing grit in suspension, many types of rotary, gear or centrifugal pumps will soon have the rotor worn so that the pump will not work.

The question of how to attach the motor to the bed is sometimes a difficult one to solve. The automobile motor is generally supported in the car by lugs high up on the engine and made to fit the channel section of the side frames of the chassis. When installed in a boat it is a difficult problem to design a bed that will be rigid and high enough for an automobile motor.

Another difficulty encountered in trying to use an automobile motor in a boat is the depth of the base below the crank shaft. This means that the motor must be set high and the angle of the shaft increased accordingly.

To give satisfactory service in a boat the motor must be securely held down to the bed, and this is very difficult to accomplish with

(*Continued on page* 56)


Real Circulating Pump
Thick Cyl Walls for Salt Water
Thrust Bearing
Base Made of Alloy to Withstand Salt Water
Fly Wheel not at Clutch End
Motor Designed to Set on Angle
Bearing between each two Connecting Rods
Provision for reverse
Motor Supported Low Down
Separate Oil Well for each Crank
Crank Case Plate on Side

The two sides of a typical marine engine. Some of the features which are lacking in the automobile motor are noted. It is because of the absence of these vital points that the automobile engine is not a success in a boat

A Surface Propeller Working Boat

A New Type of Cruiser that Will Run Through the Heaviest Weed Growths and in Shoal Water Built by Murray & Tregurtha Company Under Hickman Patents

By Albert Hickman

THE boating public perhaps generally associates surface propellers with high-speed sea sleds. The readers of MoToR BoatinG, however, will remember that our first experiments with surface propellers were carried out, not with the sea sled type of hull, but with hulls of ordinary boat forms, flat-bottom, V-bottom, and round-bottom boats; and it was only when he wanted to run surface propeller boats at relatively high speeds that the inherent defects of the older forms of hull for speed work were taken into consideration and the sea sled hull was used. Incidentally, I think there may come a time when we will use sea sled hull principles entirely in the design of boats for relatively slow-speed work—displacement boats—as well as for boats of relatively high speed in relation to their length; but more of this later.

The first surface propeller boats, with all ordinary type hulls, were known as Viper Fourth type and the sea sled as Viper Fifth type.

The advantages of the Viper Fourth type boat were the basic advantages of the surface propeller, no matter in what type of hull it might be installed. Here, after all, was the first shoal draft boat that was capable of running at any speed and the first boat of any kind that was capable of running through all sorts of weed growths without being aware of their presence.

The main advantages of the surface propeller for this service summed up as follows:

(1) The boat could run on one-half the draft of water of the screw-propeller boat of the same size and power and capable of any speed. (The tunnel-stern boat is not adapted to speed.)

(2) The surface propeller boat could run through the heaviest growths of weeds without the propellers being fouled and, practically, without the speed of the boat being affected. (This was a result of the shafts

(*Continued on page* 60)

Bow view of the U-bottom, 48-footer driven by surface propellers showing similarity in appearance to a hydroplane

Stern view, showing surface propellers and overhang to prevent water being thrown aboard when backing

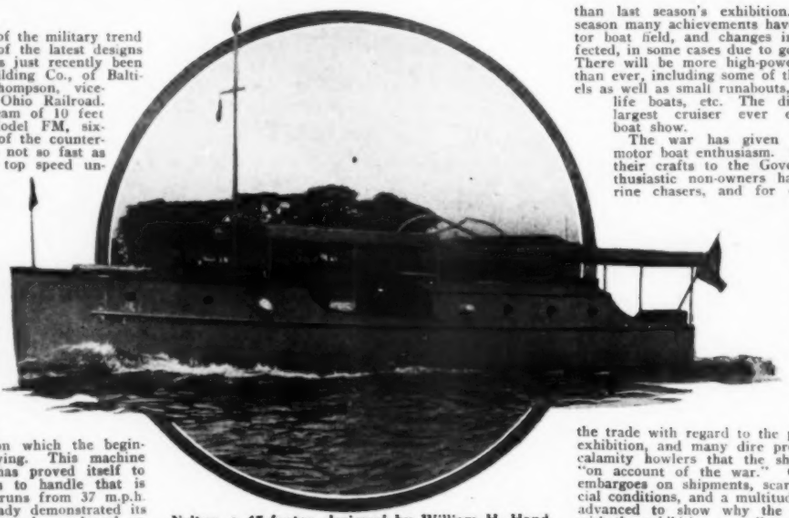
48 x 10-foot surface propeller working boat having a speed of 12 miles. She is fitted with a pair of Murray & Tregurtha four-cylinder 16-24 h.p. heavy-duty engines. The total draft of water, including propellers and protecting skeg is 19 inches

Yard and Shop

Ne'top, a 45-Footer

Ne'top is an excellent example of the military trend in express cruisers. She is one of the latest designs of William H. Hand, Jr., and has just recently been finished by the Mann Yacht Building Co., of Baltimore, Md., for Arthur W. Thompson, vice-president of the Baltimore and Ohio Railroad.

Ne'top, 45 feet long with a beam of 10 feet 6 inches, is powered with a Model FM, six-cylinder, 125 h.p Sterling motor of the counter-balanced crankshaft type. She is not so fast as to make riding on the deck at top speed uncomfortable, although her speed is above the average. The absence of vibration is noticeable, and at 18 miles an hour the craft travels quite smoothly.



Ne'top, a 45-footer, designed by William H. Hand, Jr., and built by the Mann Yacht Building Co., of Baltimore, Md., is the property of Arthur W. Thompson, vice-president of the Baltimore & Ohio Railroad. She is powered with a Model FM, six-cylinder, 125 h.p. Sterling motor of the counter-balanced crankshaft type which gives her a speed of 18 m.p.h.

Lawson Military Tractor Airplanes

While the Lawson Aircraft Corp., of Green Bay, Wis., are building their machines according to the specifications of the United States Government, they have brought out a distinct Lawson type in which they have incorporated many new features.

At the present time the company is building two classes of machines. One is known as the M.T.1, which is constructed for a primary training machine upon which the beginner gets his first lessons in flying. This machine has great safety qualities and has proved itself to be one of the easiest machines to handle that is in use to-day. Its speed range runs from 37 m.p.h up to 78 m.p.h., and it has already demonstrated its ability to land in fields which have been plowed up and intersected with ditches.

The other class of machine which the company is building at the present time is the M.T.2, which is an advanced type of training machine which can be used by the army aviator who is just about to go to France for regular fighting work. The speed of this machine ranges from 40 to 90 miles an hour. Besides being used for an advanced type of training machine it also can be used as a reconnaisance machine for work over the trenches. It is admirably adapted for this sort of work owing to its great range of speed whereby it can slow down to less than 40 miles an hour if it should be necessary, for instance, in order to enable the observer to photograph his points or to draw maps of different positions of the enemy, while at the same time it enables the pilot to speed up to over 90 miles an hour in case the machine suddenly is pursued by one of the enemy's fighting machines.

An advanced type of training machine, built by the Lawson Aircraft Corp., of Green Bay, Wis., which can be used by the army aviator who is just about to go to France for regular fighting work. The machine is 44 feet wide, 10 feet high with an overall length of 25 feet, 6 inches and weighs 1,300 pounds empty

The span of the upper wings is 44 feet 6 inches, that of the lower wings, 32 feet 6 inches. The machine is 10 feet high with an overall length of 25 feet 6 inches. It weighs 1,300 pounds empty. A useful load consists of a pilot and passenger, 350 pounds; gasoline, 15 pounds; oil, 25 pounds, and accessories, 50 pounds, bringing its weight loaded to 1,900 pounds.

Besides these two classes of machines which the Lawson company has already built they will shortly begin work on what is known as the Pursuit type of machine which will be built for fighting men only, and will be constructed to fly at enormous speed. Mr. Lawson says that there will be no difficulty in the Lawson company building a machine that will fly in the neighborhood of 175 miles an hour.

In addition to this model the company will also bring out shortly a new type of battleplane.

Seventy Miles an Hour in a Motor Boat

Up at Lake George Whip-po'Will, Jr., the latest speed marvel of the age, was subjected to a number of speed tests over a carefully surveyed one-mile course. The first test consisted of six one-mile dashes, and the average speed for these six runs was 64.74 miles an hour. Two days later with a slightly smaller propeller and a few minor adjustments to the power plant, this boat went over the same course six more times and developed a speed which averaged 69.39 miles an hour, absolutely the best and fastest speed on record to date.

On the two best runs, the fourth and sixth, the average of the four watchers showed 51.35 seconds to the mile, and it is an unquestioned fact that we have with us a 70-mile an hour boat which is probably the biggest and most important announcement of the season of 1917.

Whip-po-Will, Jr., is equipped with Columbian propellers, and many other successful boats of the last few seasons also have been driven by propellers designed and built by the Columbian Bronze Corp., of Freeport, L. I.

New York Motor Boat Show Takes On a Patriotic Aspect

Plans for the Fourteenth National Motor Boat Show in the Grand Central Palace, January 19 to 26, 1918, are now well under way. At a meeting of the executive committee of the National Association of Engine and Boat Manufacturers, Henry R. Sutphen, chairman of the executive committee and vice-president of the association, presided and made a most optimistic report on the show outlook. From all present indications instead of being diminished in any way by the war the show will be materially augmented and the display of motor boats, engines and parts probably will be considerably larger than last season's exhibition. During the present season many achievements have been made in the motor boat field, and changes in design have been effected, in some cases due to government requirements. There will be more high-powered machines exhibited than ever, including some of the largest cruising models as well as small runabouts, torpedo chasers, motor life boats, etc. The display will include the largest cruiser ever exhibited at a motor boat show.

The war has given a decided impetus to motor boat enthusiasm. Many have turned over their crafts to the Government, and other enthusiastic non-owners have enlisted on submarine chasers, and for other naval duties for which they are fitted.

Just as the European war gave added impetus to the last two expositions, so the entrance of the United States into the conflict unquestionably will add greater interest to the forthcoming event. In the fall of 1916 when arrangements were being made for the 1917 motor boat show, there was considerable discussion in the trade with regard to the probable outcome of the exhibition, and many dire predictions were made by calamity howlers that the show would be a failure "on account of the war." Government restrictions, embargoes on shipments, scarcity of materials, financial conditions, and a multitude of other reasons were advanced to show why the war would play havoc with the exhibition as well as with the industry itself. What actually happened was that the 1917 show was from every standpoint by far the best exhibition ever held. More space was sold than ever before, the attendance far exceeded expectations, and the number of actual orders backed by builders and manufacturers during the show period was far in advance of any previous record.

At the time of the last exhibition, it was not generally believed that our country would be forced into the war, but now that the United States is doing its part—and a mighty big and important part it will be toward the permanent establishment of the doctrines of democracy—the 1918 show will take on a patriotic aspect on a scale which it has never before attained. Instead of an industry that, according to some opinions, was destined to be entirely wiped out by the war, the marine industry, because of huge orders for boats, engines and equipment for export and domestic use, has undergone a complete change for the better. Financial conditions of many of our plants have been vastly improved, and machinery and equipment are being utilized to their utmost capacity. Builders and manufacturers of motor boats are determined that their industry shall not lose its identity because of the big part it is to play in helping the Allies win the war, and the reflection of this attitude will be seen in the 1918 exposition.

One of the features of the exposition will be a tender of the same type as the Langley 52 by 14-foot creation which is used in handling hydro-aeroplanes at Norfolk.

In addition to the large display of motor boats and hydro-aeroplanes, there will be various exhibits of engines varying in size from 3 h.p. to the heavy-duty types of several hundred horsepower, and there will be accessories such as lighting plants, self-starting devices, steering gears, reverse gears, propellers, wheels, paints, varnishes, interior fittings and furnishings and numerous things necessary to make complete all types of watercraft.

Kennedy Machine Co. Changes Name to Atlas Machine Wks.

The name of the Kennedy Machine Co., of De-

Apache, owned by Robert F. Herrick, is a 62-footer with an 11-foot beam, designed by A. L. Swasey and N. G. Herreshoff, and built by the Herreshoff Mfg. Co. Twin Model F, eight-cylinder, 200 h.p. Sterlings produce a speed of 27 m.p.h.

Commodore is the property of the Flag Officers of the Eastern Yacht Club—Commodore Herbert M. Sears, Vice Commodore Max Aggassiz, Rear Commodore J. S. Lawrence. Commodore is 62 feet long with a beam of 11 feet, and was designed by A. L. Swasey and N. G. Herreshoff and built by the Herreshoff Mfg. Co. Two Model F, eight-cylinder, 200 h.p. Sterling motors give her a guaranteed speed of 24½ m.p.h., and an actual speed of 27 m.p.h.

troit, Mich., has been changed to the Atlas Machine Works. The entire interests and ownership of members of the Kennedy Machine Co. have been purchased by new persons. The Atlas Machine Works will continue to manufacture the well-known Bull-Dog reverse gear, said to be a reliable reverse with a free engine clutch and a forward drive that is as positive and dependable as a solid shaft and coupling.

New $5,000,000 Airplane Concern

The Standard Aero Corp. has just moved a major portion of its help and machinery to the new $1,000,000 plant at Elizabeth, N. J., consisting of six individual shops.

In addition to the original plant at Elizabeth, N. J., a new two-story aircraft assembly building has been put up, running the full length of the shops. Barracks for the men have been built, ready to hold 250 men, each with a separate room with shower bath, etc.

There is under construction an administration building which will be through within a month. This will house all office help and contain the principal executive offices, etc. Within a month the immense restaurant and lunch room of the company will be running where all the employees will be fed from the company's own kitchen. Coincident with the moving of the main portion of the operating forces to Elizabeth, the Standard Aero Corporation has found it necessary to organize an additional company under the name of the Standard Aircraft Corporation under the laws of the State of New York.

The Standard Aircraft Corp., with factories in Plainfield and Elizabeth, N. J., has been incorporated in Albany for $5,000,000, divided into $2,000,000 preferred and $3,000,000 common stock. Harry Bowers Mingle is president of the new corporation, and the board of directors is composed of Charles H. Day, C. Vernon Bradford, Daniel L. Meenan, Jr., C. G. Stratt and Mr. Mingle.

It was announced that the new concern now has millions of dollars worth of Government orders and expects to employ more than 8,000 men and women in the main plants. The company, being a pioneer in the field, expects to push to the utmost its work in employing women help as one of the best means of expediting aircraft production.

The new plant at Elizabeth, N. J., covers 87 acres and the main buildings have more than 300,000 square feet of floor space. There is also a sixty-acre flying field and five acres of waterfront on which the hydro-airplane hangars and test sheds will be established. This plant represents an investment of more than $1,000,000. In addition to the two main plants, the Standard Aircraft Corp. has seven smaller factories in which parts of airplanes are made. It is expected that sixty airplanes a week will be the normal output of this new corporation.

A number of changes in personnel have taken place with the new organization, which are as follows:

Clifford Talbot, formerly superintendent of the New England Westinghouse, has taken charge as works manager of all the plants.

E. E. Pennewill, formerly superintendent of the Standard Aero Corp., becomes general manager, and C. V. Bradford, formerly general manager, becomes vice-president.

The headquarters and main offices of the company will be at Elizabeth, N. J.

Standardized Cruisers for Immediate Delivery

If there is one diversion which offers a maximum of pleasure, change of environment, rest of mind and body as well, sunburn, health and real recreation, it is cruising. However, the boat must embody such recognized and proven standards of construction and equipment as are found only in such craft as the best designers and builders have perfected.

For the many American yachtsmen who have turned over to the Government their boats for service in the patrol squadron fleet, the Great Lakes Boat Building Corp., of Milwaukee, Wis., offers immediate delivery on standardized cruisers admirably adapted for cruising in Southern waters, cruisers built to the highest standards known to the industry, completely equipped ready for operation.

The day of the standardized boat is here. Both boat-builders and owners have found that the standardized boat is better in many ways. All details have not only been thought out on paper but have been worked out in practice.

It has been possible to standardize on construction and equipment, order material in quantity and enable the workmen to become familiar with every detail of their work, to order fixtures in reasonable quantities, to design special features and have them made up in quantity.

The U. S. patrol boat, S P 1010, was turned over to the Government by K. D. Clark, C. E. Kauffman, William B. Purcell and William M. Young, all of whom are serving in the Naval Reserve at Chicago

A 36-foot U. S. life-boat, powered with a Model FH, four-cylinder, 25-35 h.p. Sterling motor, which gives her a speed of 8 1-10 knots per hour. Under sail without power—note the sturdy masts and the simple method of holding them down

Correction

In our December issue on page 54 in the list of manufacturers of boats for outboard motors the address of the Keystone Boat Mfg. Co., was given as Wayzata, Minn. The correct address of this company is Darby, Penn.

An Addition to the Universal Plant

The Universal Motor Co., of Oshkosh, Wis., has just completed a two-story addition to its plant, 40 by 180 feet, which is now being occupied. The addition is of concrete construction and has a modern testing department built in with all facilities for testing marine motors and generating sets. The marine motors are set at an angle averaging that occupied in a boat and are attached to a propeller wheel which operates in a tank of water, giving load and general conditions as nearly as possible to those of actual use in a boat. The generating sets are tested with electrical load varying from no load to full capacity. The testing department will handle fifteen motors per day.

The machine department has been largely extended, many new machine tools having been added, some of special design, to handle the standard Universal parts.

The assembling department has been enlarged also, with many improved handling devices and equipment for the handling of the motors in process.

In the layout of the new extensions, arrangements have been made for the storage of raw materials, castings, etc., and a department for finished parts where each part is carried separately and in sufficient quantities to take care of the demand for purposes of repairs and for general manufacture. One of the Universal features is to hold the motor standard without changes, which is of utmost benefit to the user and prospective customer.

The new plant has enlarged offices, with a complete sales department under the direction of C. J. Pope, sales manager of the company, where every inquiry has personal attention.

The present plant is equipped to make every part of the motor, including castings, all machinery, heat treating, reverse gears, elaborate testing, etc., in fact all parts except screws and drop forgings.

The Universal motor is designed to take any form of ignition system, unisparker or magneto, the choice resting with the customer unless no ignition is specified, in which case the unisparker system is supplied.

The Universal Motor Company is at present filled nearly to capacity with Government work, supplying the 4-KW generating sets for portable army work, but the company feels that with the present increased facilities its general trade can be supplied in addition to the Government work.

Columbian Bronze Corp. Moves to New York City

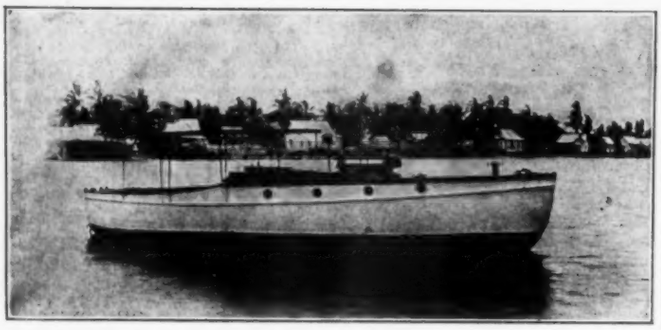
L. J. Hall, president of the Columbian Bronze Corp., announces that the general offices of the corporation have been transferred from Freeport, L. I., to their new offices, due to the increasing growth of business. In future all correspondence should be addressed to the Columbian Bronze Corp., 50 Church St., New York, N. Y., as this will be the future principal office of the firm and all general business will be transacted from this address.

Company in Sweden Asks for Catalogues

The A. B. Stockholms Motorbatsvarv, Drottninggatan II, of Stockholm, Sweden, is one of the biggest and best known companies of its kind in Sweden. They are manufacturers of all kinds of high-class motor and sailing crafts and dealers in accessories and supplies for motor boats.

This company desires quotations on all kinds of marine motors and motor

The largest mushroom anchor in the world weighs five tons, and is manufactured by the Chas. D. Durkee Co., of New York, N. Y.



A well-designed craft powered with a Red Wing motor. Two of the notable features are the large cockpit and the ample size of the skylight, affording the best of ventilation for the cabin

boat accessories and also all kinds of supplies for the building and fitting out of motor boats, especially valuable inventions, on a sole agency basis for Sweden.

They intend to order a great many United States articles in the motor boat line as soon as the war will be ended and they want catalogues and offers now in order to avoid delay.

Racine Boat Co. Consolidates with Simmons Boat Co.

The Racine Boat Co., of Racine, Wis., has consolidated with the Simmons Boat Co., of Chicago. P. M. Godske retires from the business and Ned Simmons comes in as vice-president. This consolidation increases the facilities of the plant immensely as with the Simmons plant they are now able to build boats up to 150 feet in length. This looks like an exceptionally fine combination and will undoubtedly work out to mutual advantage.

A Red Wing Motor Installation

Shown in one of the accompanying illustrations is a well-designed little craft powered with a Red Wing motor, manufactured by the Red Wing Motor Co., Red Wing, Minn.

The galley is in the after end of the cabin on the port side and is fully outfitted with dish rack, shelves, stove, lockers and an ice-box.

The boat is fully equipped with all fittings required, including electric lights. Two of the notable features are the large cockpit and the ample size of the skylight, affording the best of ventilation for the cabin.

Electric Lights for Motor Boats

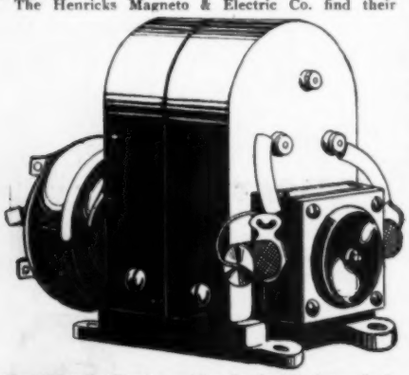
Electricity has become an essential to the lighting of motor boats, and the Eureka electric lighting outfits, manufactured by the Hendricks Magneto & Electric Co., of Indianapolis, Ind., has already passed the test of long use under varying conditions.

There are three outfits bearing the Eureka name—the five-light outfit, the ten-light outfit and the twenty-to-thirty-light outfit for large motor boats and cruisers. Each one is built to give a greater amount of current than the rated output and will not fail under the demand for extra heavy service.

These Henricks Eureka outfits do double duty—ignition for the engine as well as light. Two sources of current are always available, one from the battery and one from the generator. If the storage battery should become disabled, the generator will carry the entire load of lighting and ignition. Should the generator be temporarily out of use, the battery will carry the entire load for several hours.

One change has been made in the Henricks Eureka. The automatic cutout has been replaced by a magnetic cutout. This insures protection of the battery against discharge due to short circuits, low speed or other causes. The well-known governor which has always proven so satisfactory has been retained. This governor insures a uniform charging rate at variable engine speeds, protecting the battery against overcharge.

The Henricks Magneto & Electric Co. find their



The Henricks Eureka outfits do double duty—ignition for the engine as well as light. Two sources of current are always available, one from the battery and one from the generator. If the storage battery should become disabled, the generator will carry the entire load of lighting and ignition

popularity spreading to many foreign countries. While they have always exported large numbers, they have recently added India, Chili and the Fiji Islands to their list.

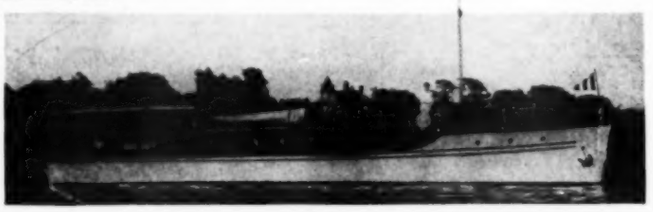
U. S. Lighthouse Service Has Busy Year

The United States Lighthouse Service maintains aids to navigation in all coasts under the jurisdiction of the United States, except the Philippine Islands and Panama, and also on the principal interior rivers. This service is charged with the maintenance of aids to navigation along 47,192 statute miles of coast line and river channel.

On June 30, 1917, there were 5,796 persons employed in the Lighthouse Service, including a technical force of 122, a clerical force of 149, and 5,525 employees connected with depots, lighthouses and vessels.

During the fiscal year there was a net increase of 275 in the total number of aids maintained, the total at the end of the year being 15,223. Of these 5,420 are lights of all classes and 588 are fog signals. The total number of aids in Alaska, comprising lights, fog signals, buoys and daymarks in commission at the close of the fiscal year, was 416, including 159 lighted aids. Fifty tenders and sixty-eight light vessels were in commission.

During the year of 1917, services in saving life and property were rendered and acts of heroism performed by employees of the lighthouse on 160 occasions. In each of these cases a commendatory letter was issued by the Secretary of Commerce, and in the case of the work of the lighthouse tender Cypress, John P. Johnson commanding, on July 13-15, 1916, near Charleston, S. C., under unusually difficult and dangerous conditions, a letter of commendation was issued by the Navy Department.



Suis Moi, a 61-foot cruiser owned by Robert Henke, of New York, built by the Elco Co., Bayonne, N. J., and driven by a 90-100 h.p. Buffalo engine

Suis Moi, a 61-Footer

Suis Moi, shown in one of the accompaning illustrations, is a 61-foot cruiser owned by Robert Henke, of New York, N. Y. This boat, built by the Elco Company, Bayonne, N. J., is powered with a 90-100 h.p. Buffalo engine, and is said to be quite an attractive craft.

Testimonials

L. W. Ferdinand & Co., of Boston, Mass., have received a letter from Harry A. Parsons, Commodore of the Cleveland Yacht Club. Mr. Parsons says:

"The No. 1 extra quality Jeffery's marine glue which has been used this spring on my 85-foot yacht, Mahapa II, for paying the seams of the new deck has proven satisfactory and is in our opinion the best product for this purpose on the market. We have used Jeffery's marine glue on our other yachts both as a seam composition and for laying canvas decks, and it has always proven durable and satisfactory."

They also received a letter from J. C. Miller of Cleveland, O. Mr. Miller is another enthusiast. This is what he says:

"Last spring I wanted to secure a perfectly smooth, waterproof hull surface on my hydroplane Baby Jinx and decided to cover it with canvas laid in glue. First I applied a hot coat of No. 7 soft quality Jeffery's marine glue, then applied the canvas cut to shape and afterwards secured perfect contact by ironing it on with an electric iron. I was surprised and delighted at the smooth surface this gave. She was considerably faster and didn't leak a drop."

Established in 1849

Louis Dusenbury & Co., Inc., importers and manufacturers of upholstering materials for automobiles, carriages, motor boats and aeroplanes, is an old established house. C. Coles Dusenbury, father of Louis Dusenbury, founded the company in 1849 and Louis Dusenbury came into the business thirty-seven years ago. His son the grandson of C. Coles Dusenbury, became connected with the concern four years ago, though he has since volunteered in the 22d Engineers and is now at Spartansburg.

Louis Dusenbury & Co., Inc., expect to make a specialty of all trimmings for yachts and motor boats as this works in very well with the line they handle. They are selling agents for more than twenty mills and are representatives for a number of foreign mills in normal times.

Correction

In our December issue, on page 105, in the advertisement of the Langtry Machine and Tool Co., of Detroit, Mich., we stated that the Langtry standard reverse gears were in four sizes, from 1 to 15 h.p. This is entirely in error as it should have read four sizes, 1 to 150 h.p.

(*Continued on page 84*)

Personalities

Frank B. Sexton

Frank B. Sexton comes from a seafaring family. As at one time twelve of the family were employed as either captains or engineers on the Mississippi River packets, it is only natural that he should have followed in the footsteps of his ancestors.

Frank B. Sexton

Mr. Sexton is a mechanical engineer, having graduated from the University of Washington, at Seattle, Wash.

In February, 1893, he entered the employ of one of the largest manufacturers of heavy duty gas engines in San Francisco, Cal., with whom he stayed for seven years.

In April, 1900, Mr. Sexton withdrew from the manufacturing end of the motor boat industry and accepted the position of port engineer for one of the largest salmon-packing corporations in Alaska. The duties of this job carried him from one end to the other of the Alaska coast line.

During the year of 1901 and 1902, he operated a line of tow boats in and about Puget Sound and Southeastern Alaska, but sold out in the spring of 1903 and returned to Alaska. He traveled over the entire Alaskan Territory during 1903 and 1904 selling steam-thawing machinery. Practically the entire country had to be covered by dog-team and snow shoes, as in the early days no transportation facilities were available.

During the early part of 1905, Mr. Sexton was associated with H. W. (Dad) Starrett in the Sunset Boat & Engine Co., at Seattle, Wash., selling Frisco Standard engines, but the San Francisco earthquake destroyed the factory and Mr. Sexton withdrew from the Sunset Boat & Engine Co. and accepted the position of mechanical engineer in charge of all the power plants of the largest mining syndicate in Goldfield and Rhyolite, Nevada. The panic of 1907 put the mining game out, so he then entered the employ of the Rober Machinery Co., of Portland, Ore., as their general sales manager, which he held until May, 1910, when he left to accept the position of president and manager of the Gas Power & Supply Co., of Portland, Ore., an organization which made a nation-wide reputation for its aggressiveness.

On January 3, 1914, Mr. Sexton resigned from the Gas Power & Supply Co. and opened an office as mechanical and consulting engineer, but found he could not keep away from his first love and the longing for boats and engines, so on December 26, 1915, he entered the employ of the Van Blerck Motor Co., of Monroe, Mich., as their marine sales manager.

June 1 found him occupying the position of assistant sales manager and on October 1, 1916, he was promoted to general sales manager. Three months later, the Van Blerck Motor Co. moved their general sales offices from Monroe, Mich., to 50 East 42nd St., New York City, and Mr. Sexton was picked as the man to hold down the position of manager of sales and advertising, and also have direct charge of all service for the New York and New England territories.

Mr. Sexton is an ardent motor boat fan and a great believer in the future of the motor boat industry.

H. C. Langtry

H. C. Langtry, of the Langtry Machine & Tool Co., of Detroit, Mich., has made a wonderful success of the machine tool business. In August, 1910, he started in the marine accessory business with $400, having had previous experience in machinery lines. He has built up a very large business and last spring bought the Michigan Standard Gear Co., formerly the Detroit Standard Gear Co., and now controls it exclusively. His company is now shipping about forty gears a day.

H. C. Langtry

Mr. Langtry has said that from the $400 which he had for investment six years ago, he would not sell

(*Continued on page 58*)

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"Certainly *Marjo* is Valsparred—all Albany boats are"

That's what The Albany Boat Corporation, builders of ***Marjo,*** wrote us about "the season's fastest cruiser." These famous boat-builders take no chances—they use Valspar exclusively.

Marjo is owned by Mr. Joseph McAleenan, and is a boat to be proud of. She made the run from Albany to New York at an average of over 31 miles per hour. In other trips she has covered over 36 miles in the same time.

Every inch of her forty feet is as good as it can be made. And she is Valsparred throughout.

Do you realize the advantage of Valspar for ***your*** boat?

Do you realize that Valspar is water-proof and weather-proof and that it won't turn white or spotty in water—cold or hot, fresh or salt?

Valspar is used by the largest steamship lines and the leading builders. It gives universal satisfaction under every condition of service.

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Valspar Enamels—in a variety of beautiful, permanent colors, ground in Valspar. Exceptionally good for canoes and all enameled work. Colors exceptionally brilliant.

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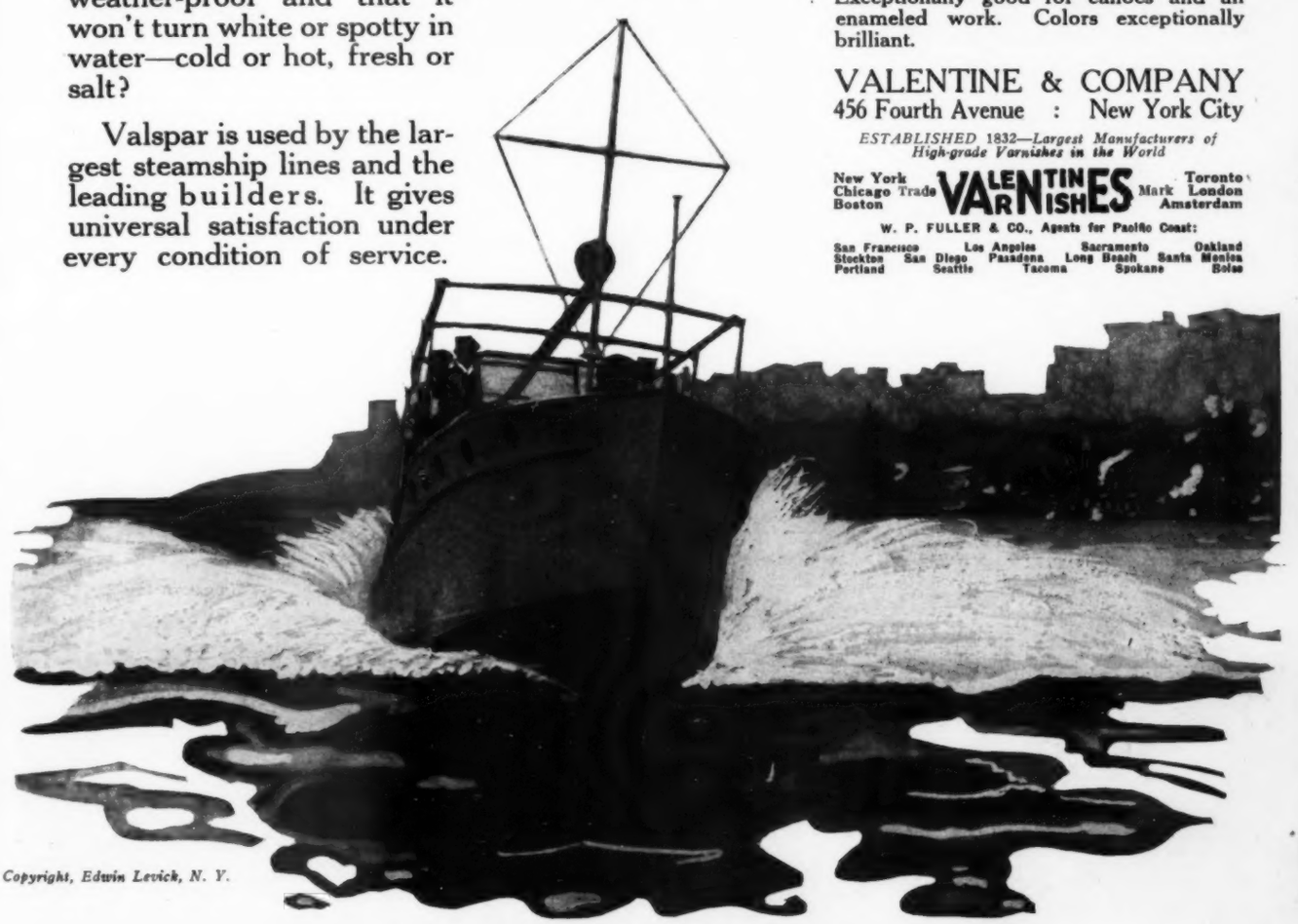

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15 William St., New York
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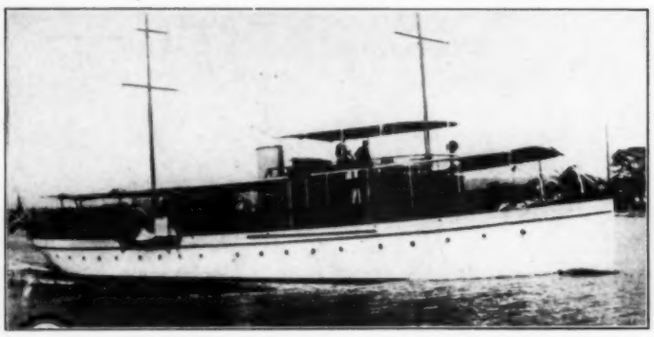
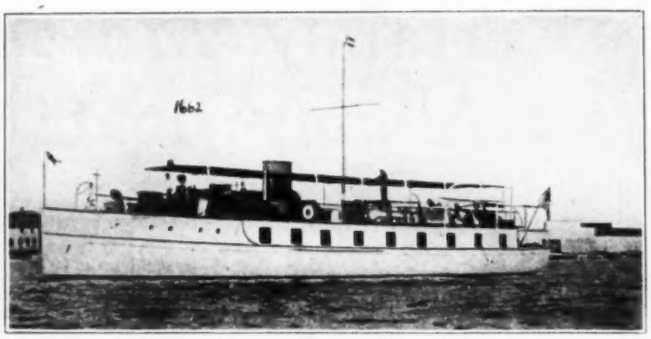
We have a complete list of all steam and power yachts, auxiliaries and houseboats available FOR SALE and CHARTER. A few are shown on this page. Plans, photographs and full particulars furnished on request.

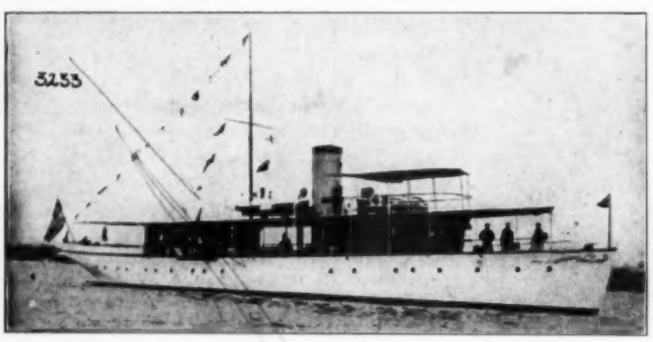
WINTER CHARTER—We specially offer several modern GASOLINE HOUSEBOATS particularly adapted for FLORIDA waters. The demand last season greatly exceeded amount of available craft; these conditions will doubtless prevail next Winter, therefore early arrangements are advised.



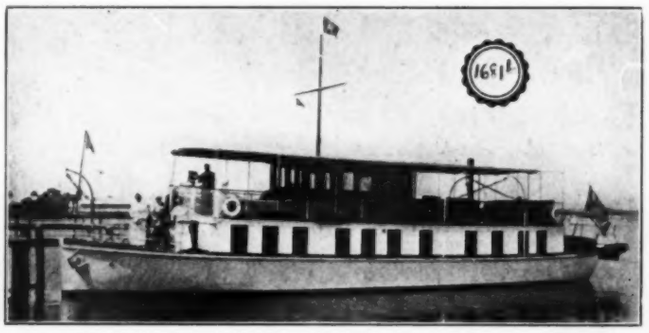
No. 1796—For Sale or Charter—Very roomy, twin screw cruising power yacht, 99 x 17 x 4 ft., adapted for Florida service. Speed 12-14 miles; Standard motors. Large dining saloon, six staterooms, three bathrooms; all conveniences. Cox & Stevens, 15 William Street, New York.



No. 1662—For Charter—Attractive 90 ft. twin screw gasoline houseboat; speed 10-12 miles. Large saloon, four staterooms, two bathrooms; all conveniences. Handsomely furnished. Cox & Stevens, 15 William Street, New York.



No. 3233—For Sale or Charter—Particularly desirable 123 ft. steel yacht. Speed up to 17 miles. Recent build. Dining saloon and social hall on deck; five staterooms, two bathrooms, etc. Cox & Stevens, 15 William Street, New York.

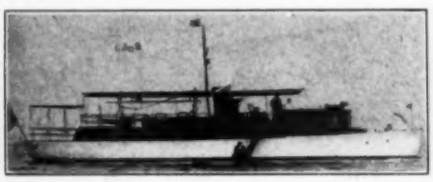


No. 1681—For Sale or Charter—Modern, shoal draft, twin screw gasoline houseboat; 70 x 16.9 x 2.6. Speed 10-11 miles; two 30-45 H.P. Sterling motors (new 1915). Large main saloon, three double staterooms, bath, three toilets, in addition to deck saloon. Independent electric lighting and hot water heating plants. Cox & Stevens, 15 William St., New York.

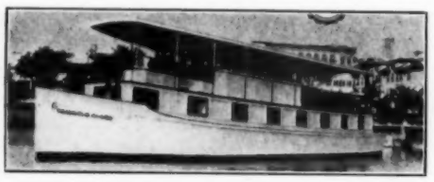
No. 2888—For Sale—Twin screw Diesel power yacht; 110 x 18 x 6 ft. Speed 12-14 miles; two 150 H.P. 6 cyl. Craig-Diesel motor. Dining and main saloons; four staterooms, bath, four toilets, etc. Very economical to operate. Cox & Stevens, 15 William Street, New York.

No. 647—For Sale—Modern, flush deck, light draught, auxiliary schooner yacht, 106 x 75 x 24.6 x 5.6 ft. Speed under power 9 knots. Large saloon, three staterooms, two bathrooms, electric lights, hot water heating plant, etc. Cox & Stevens, 15 William Street, New York.

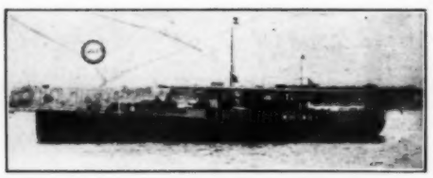
No. 3092—For Sale or Charter—(Now in Florida waters)—75 ft. Lawley built twin screw power yacht. Speed up to 14 miles. Attractive dining and main saloons, double stateroom, etc. Handsomely finished. Cox & Stevens, 15 William Street, New York.



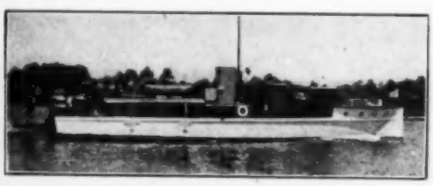
No. 1130—For Sale—Gasoline cruiser, 70 x 13.6 x 3.6 ft. Speed 11-13 miles; 6 cyl. Winton motor. Dining saloon, three staterooms, bath, main saloon, etc. In commission. Low figure accepted. Cox & Stevens, 15 William Street, New York.



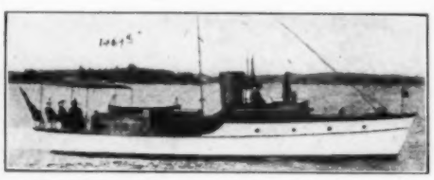
No. 3525—For Charter—(In Florida)—62 ft. gasoline houseboat. Speed 9 miles. Dining and main saloons, three staterooms, bath, etc. Cox & Stevens, 15 William Street, New York.



No. 1324—Bargain—Fast gasoline cruiser; 70 x 11 x 4 ft. Speed up to 15 miles. Dining and main saloons, double staterooms, etc. Cox & Stevens, 15 William Street, New York.



No. 3490—For Sale—High speed, twin screw cruiser; 60 x 10.6 x 3 ft. Built 1917. Speed up to 25 miles. Double stateroom, saloon, two toilets, electric lights, etc. Pilot house has three transom seats and engine controls. Offer desired. Cox & Stevens, 15 William Street, New York.



No. 1469—For Sale—Modern bridge deck cruiser; 52 x 11 x 4 ft. draught; 25/35 H.P. Standard Motor; speed 11 miles. Double stateroom, saloon, galley, toilet room, etc. Interior finish African mahogany throughout. Bargain for quick sale. Cox & Stevens, 15 William Street, New York.

No. 3481—For Sale—Practically new, high speed bridge deck cruiser; 50 x 11.3 x 2.9 ft. Speed up to 24 miles, 200 H.P. Van Blerck motor. Double stateroom, saloon, electric lights, etc. Handsomely finished. Cox & Stevens, 15 William Street, New York.

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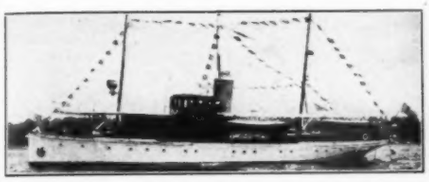
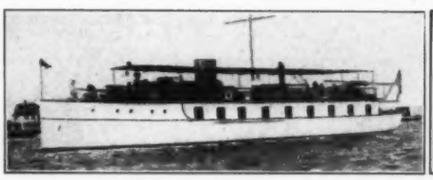
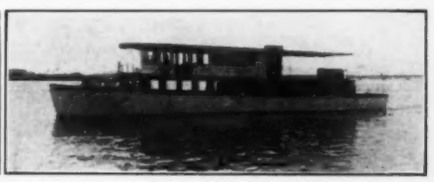
We are pleased to offer below an exceptionally fine list of first class yachts of every size and type, some of which are available at bargain prices. Full particulars will be mailed immediately upon request. We also have for Winter charter a number of desirable gasolene house boats now in Florida waters and we would suggest early selection. Our handsome Illustrated Yacht List mailed free.



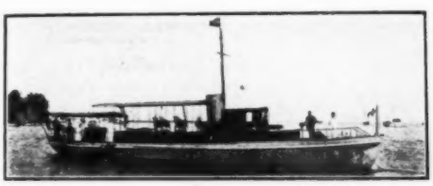
7920—95 ft. Seagoing Cruiser. All conveniences. The best craft of character available.



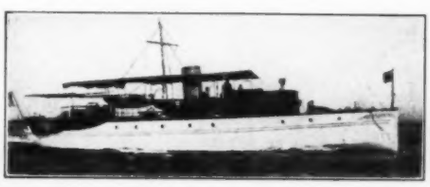
8727—For Charter—90 ft. Twin Screw Cruiser. 4 staterooms; 2 baths. **Speed 10-12 miles.**



8804—For Charter—Brand new 85 ft. Houseboat; attractive terms; inspectable Florida.

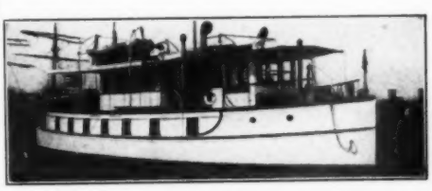


8725—**Shoal draught 83-foot Coast Cruiser. Fine accommodations.** Ideal for Florida waters.



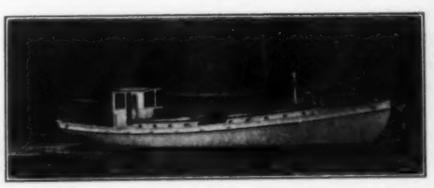
8786—The finest 72 ft. Twin Screw Cruiser offered. In commission. Speed 13 miles. Low price.

8747—This Twin Screw 70 footer is offered at low price. Condition good as new.



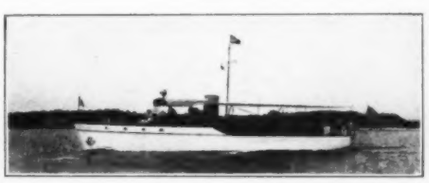
8613—For Charter—68 ft. twin screw Florida cruiser; fine accommodations. Speed 9 knots.

8757—69 ft. Twin Screw Lawley cruiser, available at bargain **price.**



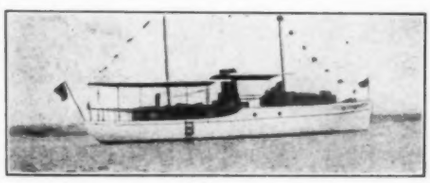
8787—62 ft. Seagoing Cruiser. Speed 11 miles. Bargain.

8767—Brand new 60 ft. Express cruiser; speed 24 miles.

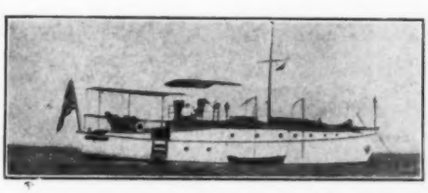


8771—60-foot Coast Cruiser. 2 staterooms. Bath. New engine. Low price.

8779—60-foot Twin Screw **Express Cruiser offered at** bargain. New engines. Speed 20 knots.

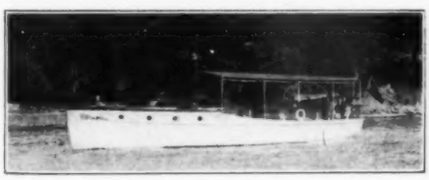


8765—55-footer with 2 staterooms; able cruiser.

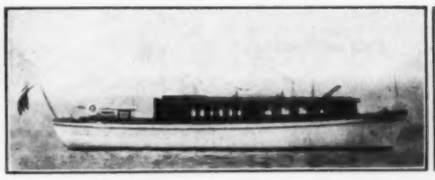


8646—Immediate sale desired of this able 55 footer.

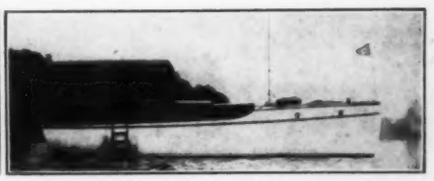
8752—Exceptionally fine 50 footer; **speed 11 miles.** Low price.



8777—45 ft. ELCO-de-Luxe Cruiser; good as new. Low price.



8744—Well known 40 ft. "Sea Rover" cruiser; 20th Century motor; bargain.



8802—Practically new 35 footer; fine accommodations; 4 cycle motor.

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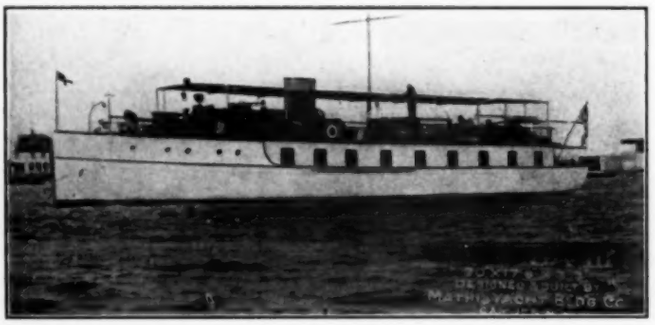
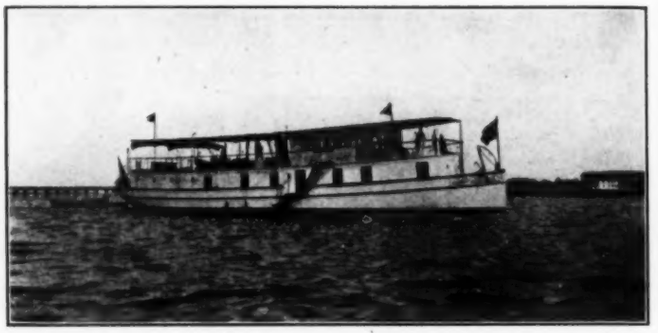
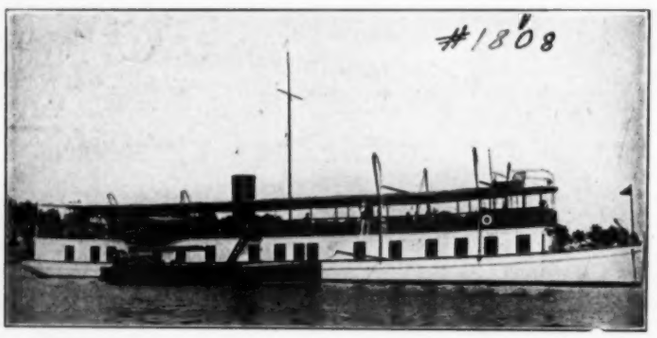
Offer for charter the following desirable houseboats all of which are admirably suited for Florida waters



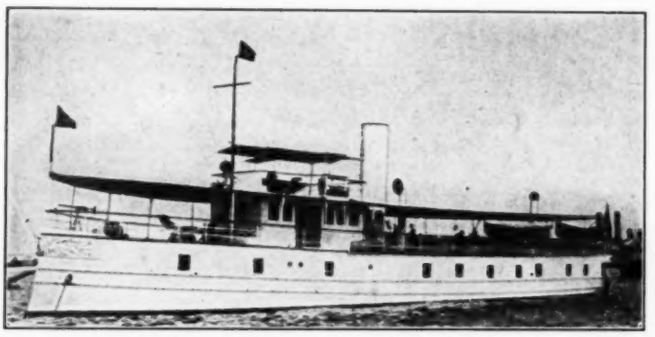
No. 1865—Exceptional opportunity to charter one of the best houseboats available. 90 ft. over all, 17 ft. 6 in. beam and 3 ft. 6 in. draft. 3 staterooms, maid's room, 2 bathrooms and dining saloon.



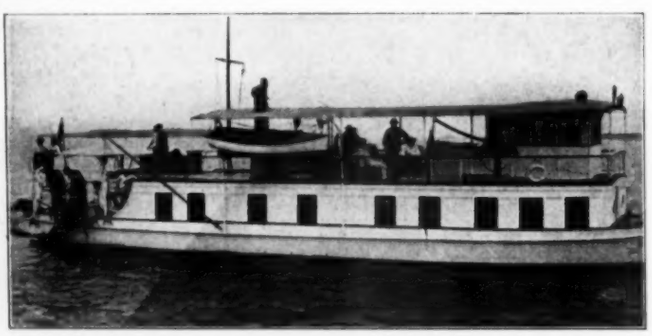
No. 1820—Charter—Desirable houseboat in southern waters, 103 ft. x 20 ft. 4 in. x 3 ft. draft. 4 staterooms, 2 bathrooms, dining saloon and large sitting room.



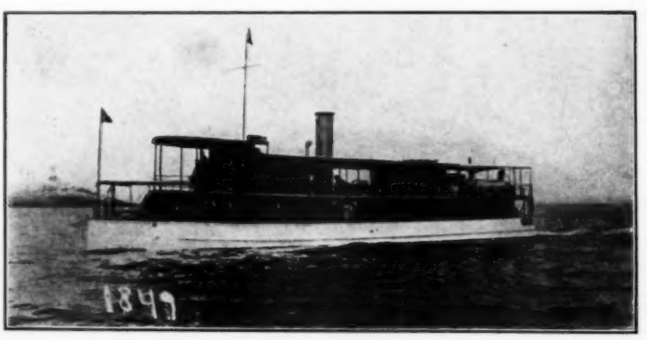
No. 1808—Sale—Charter—Now at Miami. Admirably suited for Florida waters. 125 ft. x 17 ft. 8 in. x 3 ft. 4 in. draft. 4 staterooms, 2 bathrooms, very large dining saloon, ice machine, etc.



No. 243—Sale—Charter—Twin screw steam houseboat, 116 ft. x 21 ft. x 4 ft. draft. 4 staterooms, 3 bathrooms, dining saloon and smoking room.

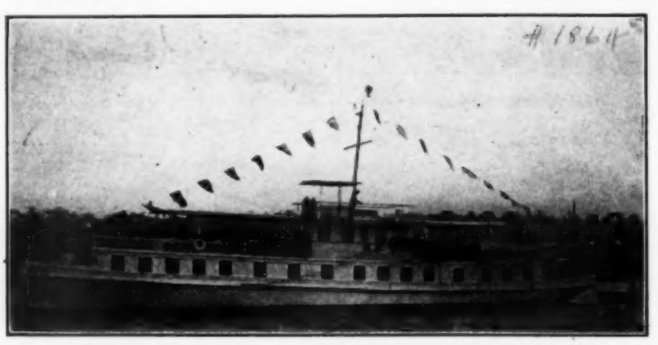


No. 1860—Charter—Shallow draft twin screw houseboat, 70 ft. x 18 ft. 6 in x 18 in. draft. 3 staterooms, bathroom, dining saloon and pilot house.



No. 1849—Charter—Desirable houseboat, 115 ft. x 17 ft. x 3 ft. 6 in. draft. Speed 12 miles. 5 staterooms, 3 bathrooms, main saloon, dining saloon, smoking and sitting rooms.

No. 1847—For Charter—Houseboat now in Florida waters, 85 ft. x 18 ft. x 28 in. draft. 4 staterooms, bathroom, large dining saloon, sitting room, etc.



No. 1864—Charter—Now in Florida waters. Modern houseboat, 110 ft. x 20 ft. x 4 ft. 9 in. draft. 4 Staterooms, dining saloon, sitting room, etc.

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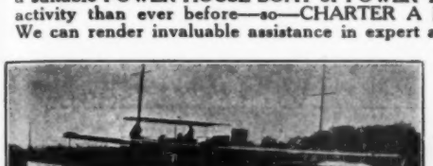
We have a most complete and up-to-date list of steam yachts, power yachts of all sizes, sail, auxiliary and houseboats on file in our office, kept constantly up-to-date by a thorough and comprehensive canvass of the entire yachting field from time to time. We are in a position to submit full information on any type of boat upon request.

FOR SOUTHERN CRUISING this Winter we offer a number of very desirable POWER HOUSE BOATS and POWER YACHTS which are specially adapted for FLORIDA waters. Last season a great number of clients were much disappointed in not being able to secure for charter a suitable POWER HOUSE BOAT or POWER YACHT owing to the great demand. Yachting this coming WINTER SEASON promises more activity than ever before—so—CHARTER A BOAT NOW AND BE ASSURED OF ONE THIS WINTER.

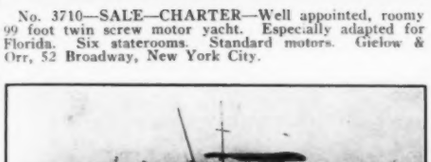
We can render invaluable assistance in expert appraisals, supervision of alterations and estimates.



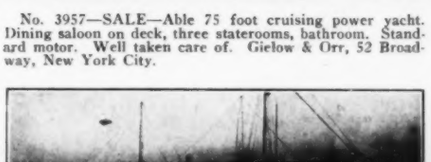
No. 3710—SALE—CHARTER—Well appointed, roomy 99 foot twin screw motor yacht. Especially adapted for Florida. Six staterooms. Standard motors. Gielow & Orr, 52 Broadway, New York City.

No. 3957—SALE—Able 75 foot cruising power yacht. Dining saloon on deck, three staterooms, bathroom. Standard motor. Well taken care of. Gielow & Orr, 52 Broadway, New York City.

No. 5565—CHARTER—83 foot cruising houseboat. Five staterooms. Two bathrooms. Now in Florida. Gielow & Orr, 52 Broadway, New York City.

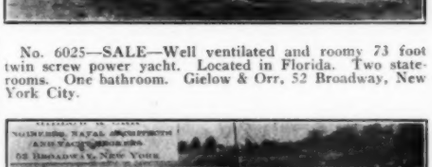


No. 6025—SALE—Well ventilated and roomy 73 foot twin screw power yacht. Located in Florida. Two staterooms. One bathroom. Gielow & Orr, 52 Broadway, New York City.



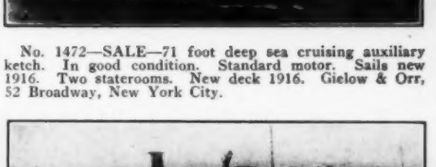
No. 5376—CHARTER—Handsome and well appointed 77 foot twin screw houseboat. Three staterooms. Two bathrooms. Deck house. Gielow & Orr, 52 Broadway, New York City.

No. 1472—SALE—71 foot deep sea cruising auxiliary ketch. In good condition. Standard motor. Sails new 1916. Two staterooms. New deck 1916. Gielow & Orr, 52 Broadway, New York City.

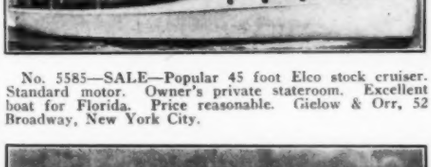


No. 5585—SALE—Popular 45 foot Elco stock cruiser. Standard motor. Owner's private stateroom. Excellent boat for Florida. Price reasonable. Gielow & Orr, 52 Broadway, New York City.

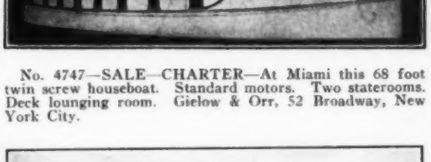
No. 4747—SALE—CHARTER—At Miami this 68 foot twin screw houseboat. Standard motors. Two staterooms. Deck lounging room. Gielow & Orr, 52 Broadway, New York City.



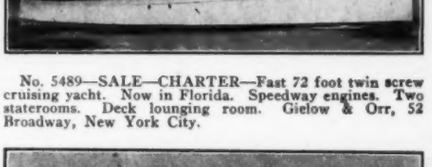
No. 5489—SALE—CHARTER—Fast 72 foot twin screw cruising yacht. Now in Florida. Speedway engines. Two staterooms. Deck lounging room. Gielow & Orr, 52 Broadway, New York City.



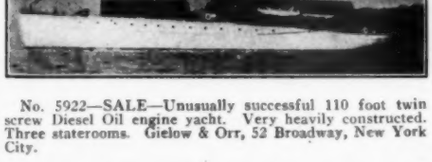
No. 5922—SALE—Unusually successful 110 foot twin screw Diesel Oil engine yacht. Very heavily constructed. Three staterooms. Gielow & Orr, 52 Broadway, New York City.



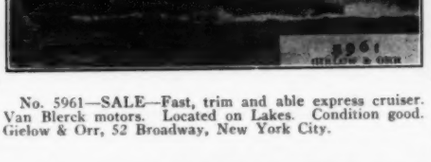
No. 5961—SALE—Fast, trim and able express cruiser. Van Blerck motors. Located on Lakes. Condition good. Gielow & Orr, 52 Broadway, New York City.



No. 232—SALE—Handsome and well appointed 145 foot steel steam yacht. In good condition. Two deck houses. Three staterooms. Bathroom. Gielow & Orr, 52 Broadway, New York City.



No. 3491—SALE—Located in Florida. 69 foot twin screw power houseboat. Owned by Estate. Designed by us. Three staterooms. Bathroom. Deck house. Sterling motors. Gielow & Orr, 52 Broadway, New York City.

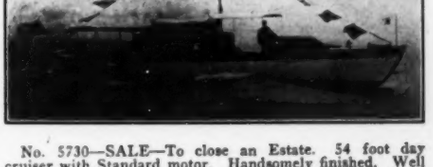


No. 5938—SALE—CHARTER—Shallow draft 76 foot overall auxiliary bugeye schooner. Three staterooms. Built 1916. Located near Norfolk. Ideal for Florida this Winter. Gielow & Orr, 52 Broadway, New York City.

No. 5730—SALE—To close an Estate. 54 foot day cruiser with Standard motor. Handsomely finished. Well taken care of. Gielow & Orr, 52 Broadway, New York City.

No. 454—SALE—139 foot steel steam yacht. Five staterooms. Two bathrooms. Two deck houses. Gielow & Orr, 52 Broadway, New York City.

No. 5545—SALE—Now in Florida waters. 44 foot express cruiser. New 1916. Van Blerck motor, speed 21 miles. Gielow & Orr, 52 Broadway, New York City.



No. 4389—CHARTER—This 70 foot twin screw power houseboat. Especially suited for Florida. Now located there. Three staterooms, bathroom. Unusually fine deck space. Gielow & Orr, 52 Broadway, New York City.

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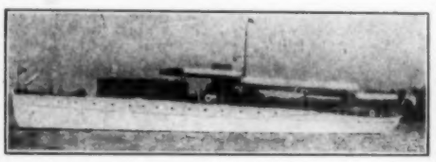
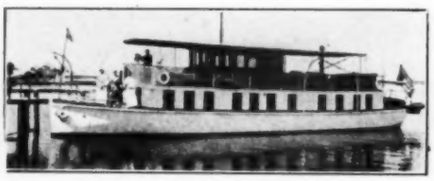
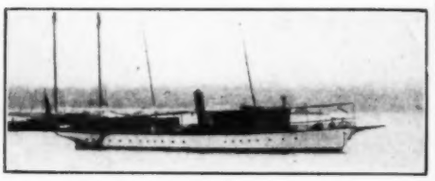


No. 1937—Diesel Power Yacht, 110 x 18, two 6 cylinder 150/180 H.P. engines, low fuel cost.



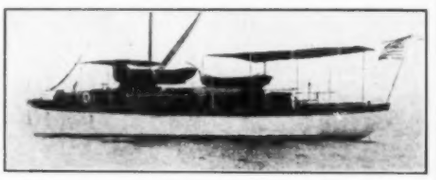
No. 37—Offered by Estate—Florida waters—70 ft. shoal draft houseboat, two Sterling motors, three staterooms, etc.



No. 2381—Flush deck, 105 ft. Power Yacht, 100 H.P. motor installed 1915, sleeps 10-12 people. Low price.

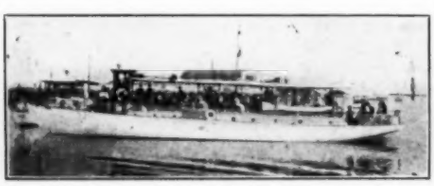
No. 924—Power Yacht, 92 ft., 100/125 H.P. 20th Century motor, splendid deck space.

No. 2005—Cabin Cruiser, 62 x 15, Twentieth Century motor, ketch rig.

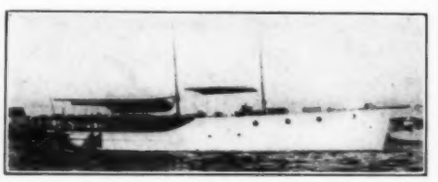


No. 1919—Attractive Power Cruiser, 60 x 12.6, fifty H.P. motor.

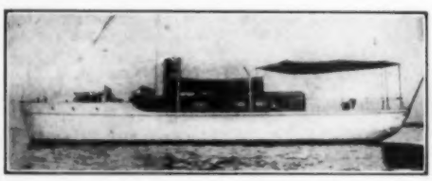
No. 2301—Recent build, 53 x 11, six cylinder, 100 H.P. motor, electric starter, speed 15 miles.



No. 2384—Power Boat, 80 x 18, Craig motor, suitable for party boat.



No. 2379—Power Cruiser, 53 x 13, four cylinder motor, speed 10 miles.

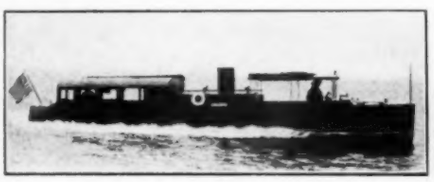


No. 1660—Bridge Deck Cruiser, 50 x 10.6, one man control; everything first class.

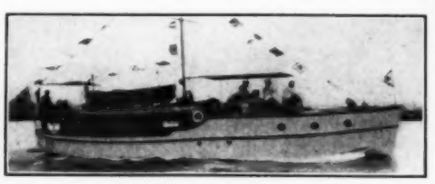
No. 889—Double planked hull, steel houses, 65 ft., 100 H.P. Speedway motor, speed 16 miles.

No. 1007—Express Cruiser, 57 x 7.9, six cylinder motor, speed 16-17 miles. Reasonable figure.

No. 2386—New Patrol type, 54 x 11.2, eight cylinder Van Blerck, speed 17 miles.

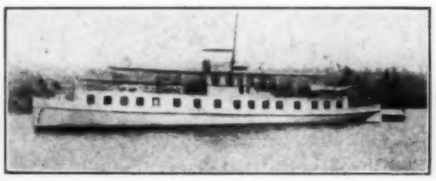


No. 2358—New Express Cruiser, 45 ft., eight cylinder, 200 H.P. Van Blerck, speed 22 miles.

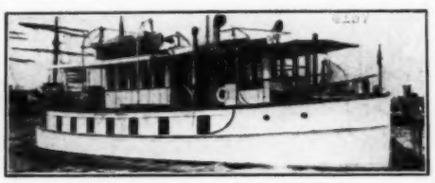


No. 2355—Bridge deck cruiser, 45 x 9.6, Lamb motor, 24 H.P.; quick sale desired.

No. 70—Power Houseboat, 52 x 14.7, Standard motor, deck controls.



No. 39—Charter; Florida waters, Power Houseboat 110 x 20, two 75 H.P. Murray & Tregurtha motors.



No. 58—Sale—Charter. Florida Houseboat 68 x 20.9, draft 30 inches; two 50 H.P. Standards.

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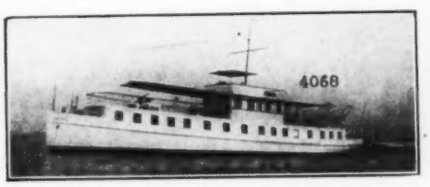
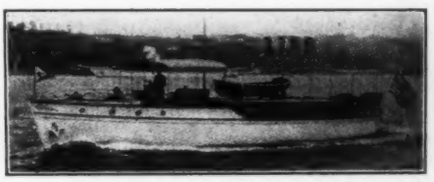
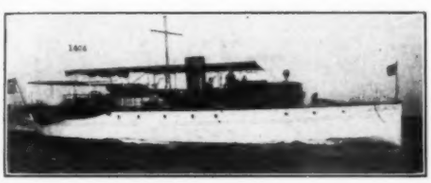
1913—55' express cruiser. Stateroom, saloon, etc. Speed 17 miles.



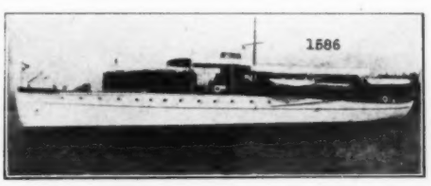
4068—Charter or Sale. Twin screw houseboat 110' long. Large accommodation. Now in Florida waters.



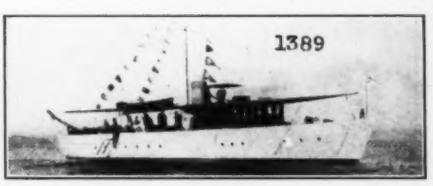
1132.—60' cruiser. Two staterooms, saloon, bath, etc. Speed 13 miles.



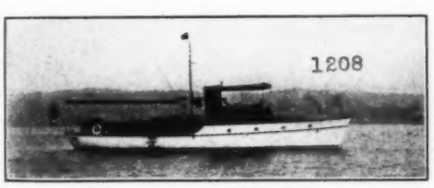
1404—70' power yacht. Twin screw. Two staterooms, saloon, bath, etc. Speed 12 miles.



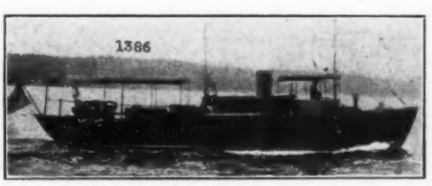
1586—110' power yacht. Twin screw. Four staterooms, saloon, bath, etc. Speed 16 miles.



1389—90' power yacht. Twin screw. Three staterooms, saloon, bath, etc. Speed 12-14 miles.



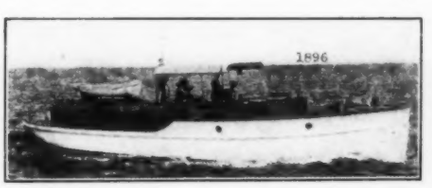
1208—52' cruiser. Stateroom, saloon, bath, etc. Speed 12 miles.



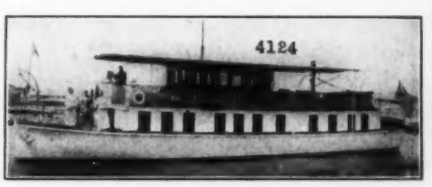
1386—56' cruiser. Stateroom and saloon sleep 6. Speed 10-11 miles.

1620—47' express cruiser. V-Bottom type. Speed 18 miles.

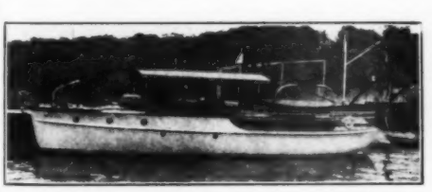
1919—45' cruiser. Stateroom and saloon sleep 6. Two toilets. Speed 10 miles.



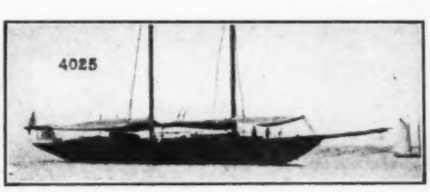
1896. 50 ft. twin screw cruiser. Double staterooms, two saloons, etc. Speed 10 miles.



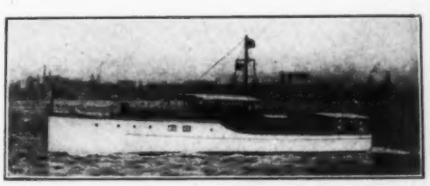
4124. 70 ft. twin screw houseboat. Three double staterooms, main saloon, social hall, bath, etc. Speed 10-11 miles.



1910. 50 ft. cruiser. Stateroom, main cabin, toilet and crew's quarters. Speed 10 miles.

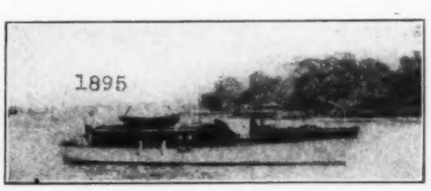


4025—106 foot auxiliary schooner, 5 ft. 6 in. draft. Four staterooms, large saloon, two bathrooms, etc. Speed 9 knots under power.

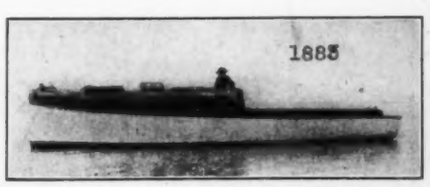


1899. Sale or charter—65 ft. express cruiser. Two staterooms, saloon, bath, etc. Speed 18 miles.

1911. 45 ft. Express Cruiser. Speed 27 miles.



1895. 50 ft. cruiser. Double staterooms, saloon, etc. Speed 10 miles.



1883. 36 ft. cruiser. Two berths in cabin; toilet, galley, etc. Speed 10-12 miles. Price attractive.

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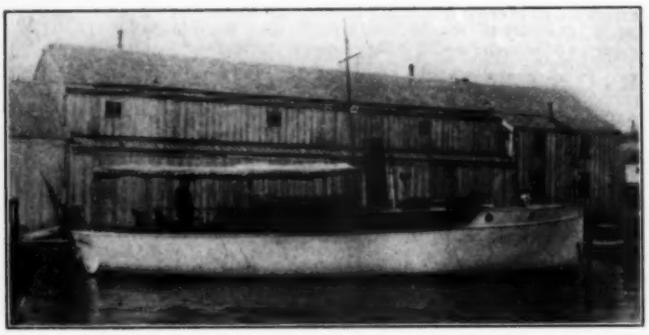
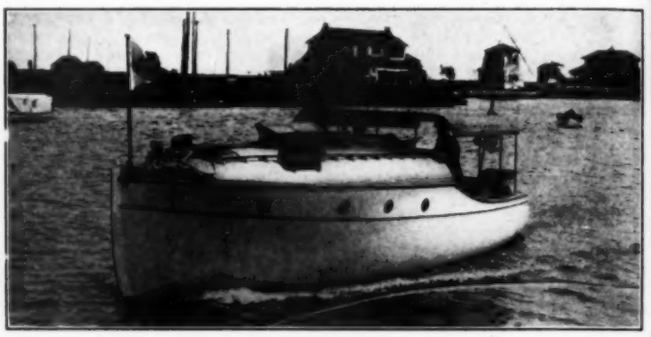
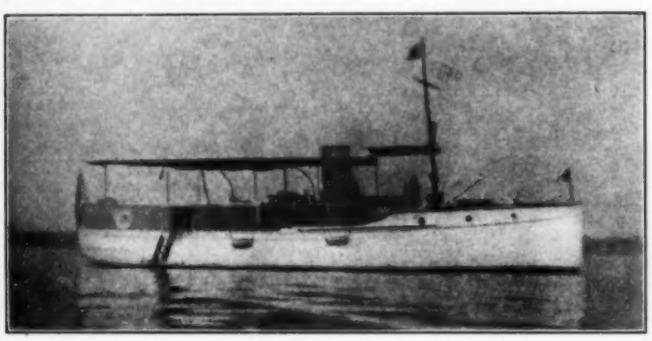


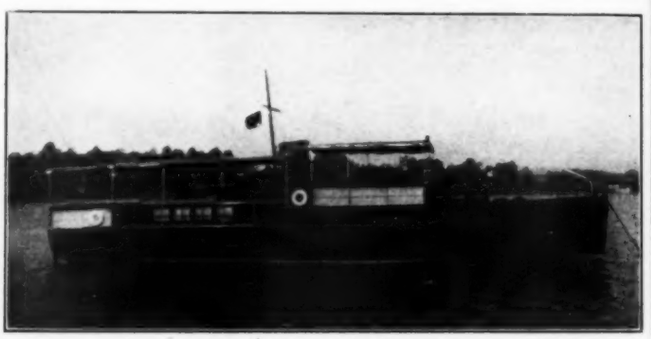
No. 1—Heavily built, sea-going cruiser, 45'-6" by 11' by 3'-6"; 45 h.p. heavy duty motor; speed 12 miles; stateroom, saloon, toilet room, galley, engine room and crew's quarters; low price for immediate sale.



No. 2—30' by 9' by 2'-6" cruiser; 15 h.p. Sterling motor; has saloon, toilet room, galley and engine room; 11 miles speed; in excellent condition.

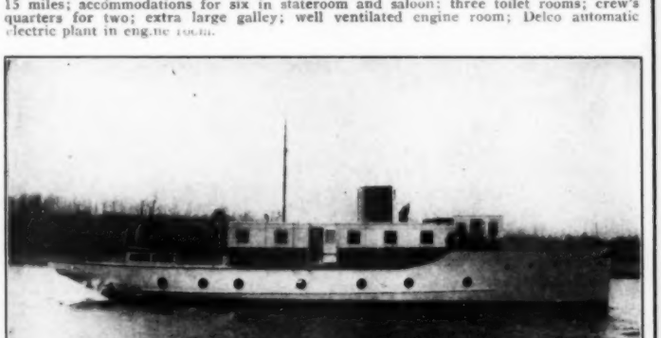


No. 3—46' by 11'-6" by 3'-6" cruiser; one man control; 75 h.p. Frisbie motor; speed 12 miles; comfortable accommodations; two staterooms, bathroom, large saloon, separate galley, crew's quarters and crew's toilet room; completely equipped.

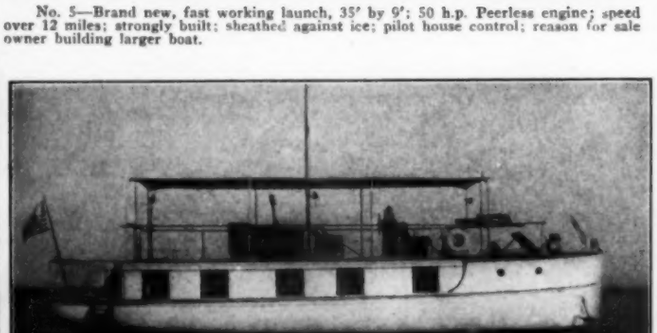


No. 4—New "V" bottom express cruiser, wide beam, good accommodations; 60' by 14' by 3'; ideal for Florida service; 8 cylinder, model F, 200 h.p. Sterling motor; speed 15 miles; accommodations for six in stateroom and saloon; three toilet rooms; crew's quarters for two; extra large galley; well ventilated engine room; Delco automatic electric plant in engine room.

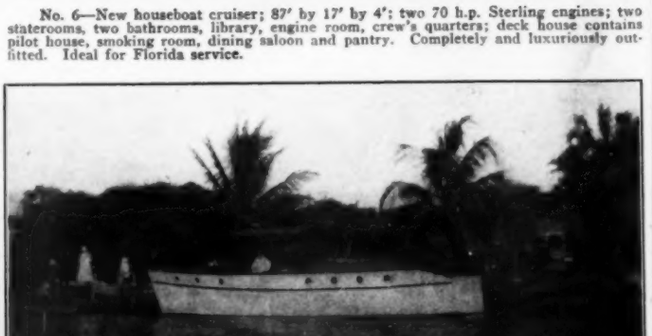
No. 5—Brand new, fast working launch, 35' by 9'; 50 h.p. Peerless engine; speed over 12 miles; strongly built; sheathed against ice; pilot house control; reason for sale owner building larger boat.



No. 6—New houseboat cruiser; 87' by 17' by 4'; two 70 h.p. Sterling engines; two staterooms, two bathrooms, library, engine room, crew's quarters; deck house contains pilot house, smoking room, dining saloon and pantry. Completely and luxuriously outfitted. Ideal for Florida service.



No. 7—For Charter—42' by 13' Mathis houseboat; stateroom; bathroom; toilet room; crew's quarters, galley, crew's toilet; 32 h.p. Standard motor; speed 9 miles.



No. 8—37' by 10' by 2'-8" cruiser; stateroom, saloon, engine room, galley and toilet room; 18 h.p. Palmer motor; speed 8 knots.

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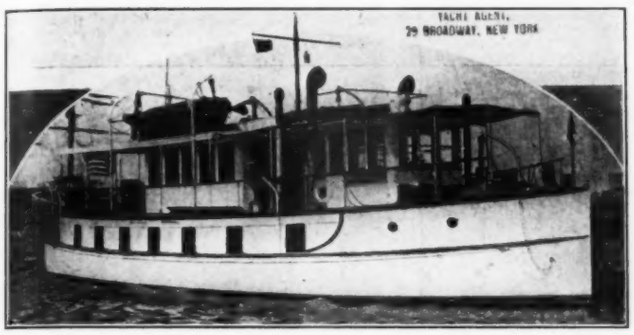
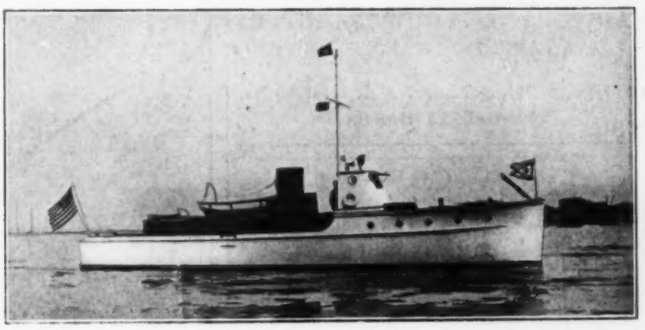


No. 6867—For Charter at Miami, Florida, particularly attractive Power Houseboat. Full particulars from Frank Bowne Jones, 29 Broadway, New York.

YACHTS OF ALL TYPES FOR SALE AND CHARTER



No. 3524—For Sale—New, fast, able, naval type cruiser; 54 x 11 x 4 ft. Speed up to 17 miles; 8 cyl. Van Blerck motor. Exceptional accommodation; forward and after saloons, single stateroom, two toilets, etc. Large cruising radius. Cox & Stevens, 15 William St., New York.

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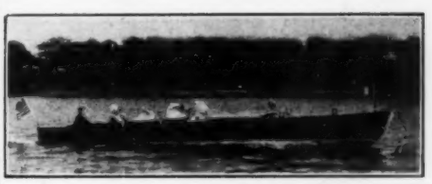
Cabin Cruiser "OASIS", Hand V Bottom 40' x 9½' x 30" Draft. Selected White Oak frame, White Pine planking. Clifton Four Cylinder Engine, Speed 11 miles. Two 115 Gal. Gas and 70 Gal. Water Tanks. Excellent Florida boat; equipped for immediate use; in first class condition. B. C. Budd, 1821—120 Broadway, New York City.

FOR SALE—One 45 foot cabin cruiser, shallow draught, built especially for Florida waters, 11 foot beam. Has upper deck with canvas over the top and around the sides. Has brand new 125 H.P. Van Blerck motor. Also has galley, alcohol stove, ice-box, sink and dish cupboard, likewise toilet and wash-room. Speed 15 miles per hour. Can be bought at a bargain.

One 45 foot cabin cruiser, Standard motor, two and one-half foot draught, equipped with galley, toilet and sleeping accommodations. One of the best built boats in the state of Florida. Especially adapted for Florida waters. Must be seen to be appreciated.

FOR SALE—One 36 foot speed boat, mahogany hull with 35-55 Sterling motor, six cylinder. Speed 20 miles per hour.

These boats are for sale and can be seen at the boat yards of C. M. McDonald & Sons, Daytona, Fla.



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For all OUTSIDE AND INSIDE work. Defies Salt Water. Guaranteed.
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White Cap Discovers Cape Cod

(*Continued from page* 18)

There is one grocery store, and in it of an evening, seated upon sacks of potatoes, boxes and benches, gathered the young bloods of the village to gossip.

On the second day the fog was as thick as on the first, and perhaps a trifle thicker. We went to the village and sent cards to everyone we could think of; then down to the entrance of the harbor, and, baiting with some of the clams we got at Cataumet, caught all the fish we could eat in three days.

It was our third day at Cuttyhunk and we had seen nearly everything except the monument erected to Bartholomew Gosnold who discovered the islands, when we clambered to the top of the hill to the Coast Guard's Station. Although occasional patches of sun had been showing all day we got very little encouragement from the man in the tower. He just said the fog seldom lifted at that time of the year and told us to look at the big bank hanging out to sea right then; but he did lend us his glass to see across to the lesser knoll, on the extreme end of the Cape. There we could glimpse the famous Bartholomew Gosnold's monument as plainly as if we'd gone down and taken a boat across. We were very glad, for we went away feeling that there was then little on the island that we had missed.

I was delighted, that night, when piping an eye to the sky, as the old salts have it, to see a score of stars all twinkling and blinking down at me in my berth; and I glanced at the clock and saw that as it was past midnight the man in the tower was mistaken, and determined that if it would hold up for three or four hours more we'd snatch a snooze and then bolt out to sea and cross to the mainland where it should be clearer.

Hold up it did and by four o'clock the engine was chugging and we were heading our way out to sea, past the Ribbon Reef, keeping a sharp lookout for the Hen and Chickens. As we went the man in the tower stood silhouetted on top of the highest hill against the blazing red of the early dawn.

We should have included Block Island next in our trip, but the attractions at Block Island would have been very much the same as at Cuttyhunk. Once through the fog girt veil that shrouds the islands one is in another world, a world of mists, sea smells, fisher folk, and peaty mossy hills, that in Block Island have reminded me of Ireland: but of the two, Block Island or Cuttyhunk, I think the latter more quaint.

It behooved us to hustle now that we were at sea again, so the course was laid for Stonington. The Hen and Chickens lightvessel was soon abeam and from there we headed on the Sakonnet Point, that apparently being the landmark made for by the men out of Cuttyhunk. Sakonnet Point is a stretch of low-lying land having upon its extremity a white conical lighthouse with a brown foundation. It was visible from a great distance.

In Newport Bay which lies between Sakonnet Point and Point Judith, we fell in with many huge fishing nets, the positions of which were marked in places by red barrel buoys. The first time we found that we had run into one we were quite worried and ran about half a mile off our course in an effort to find an exit. But we were no sooner clear of the first trawl than we were dodging another. After a while it was evident that we should make little headway if we were to keep steering clear of the nets, so the next time we were caught we changed our tactics. We soon found that by easing down our speed and stopping the engine if it were running we could slide easily over the corks by striking midway between any two of the larger buoys.

We sailed in one side and out at the other of the refuge harbor at Point Judith. It is not interesting from the artist's viewpoint but is distinctly useful. For eighteen miles we held along the shore after this to Watch Hill Point, sighting many war vessels. The heavy gray hulls of the battleships stood sentinel here and there, whilst barely visible along the horizon, and later against the distant land, we spotted the swift torpedo destroyers. One or two vessels of the school ship class came up close as though to look us over. Later, when we were making our way through the narrow and treacherous entrance to Fisher's Island Sound a squadron of three submarines overtook us. They were all on the surface and the last of the three passed so close that it nearly severed the dinghy. After that, as the wind headed us in coming up toward Stonington we started the engine, having had a sufficiency of warships for one day.

We passed between the breakwaters and then swerving to starboard to avoid a bad spot near the point found comfortable anchorage off the old township. Children's voices and a band was all we heard of historic Stonington, for it was late in the afternoon when we got there and we were tired from a long day's sail—a run of fifty-five miles, much of it into a head wind.

A strong current aided us the next morning in leaving, and carried us rapidly along Fisher's Island Sound. We passed the Dumpling Rock and then fell in with a fleet of trading schooners coming in through the Race. We kept company with them for a while but later they drew away from us and we held closer to the Long Island side of the Sound as we were looking to pick up Herod's Point before making Mount Misery which is at the entrance of Port Jefferson Harbor.

It was dusk before we sighted the light on the breakwater and quite dark ere we "putted" up to the head of the splendid harbor behind it. The channel into Port Jefferson Harbor is very narrow and a strong tide runs through it. We nearly struck a sandy spit that runs out on the port side, being barely able to discern it in the gloom. A white spindle on this point is easily recognizable, however, when you know that you should pass to starboard side of it.

There is good water right up the harbor, which is a mile and a half long, and we found a very welcome sight in the fleet of anchored yachts, with lights in their cabins and people aboard. They were the first we had seen during our trip. This being our return to civilization we treated ourselves to a feed ashore and loaded the dink to the gunwale with fresh provisions and oil and grease for the engine. It is surprising how much a new one will eat up.

From then on conditions and weather alike changed most miraculously. Whereas we had been wearing thick coats and sweaters, and had cruised almost alone, we now found warmth, sunshine and the outpouring of a populous community. It was Sunday, and over every submerged rock and reef hung a hundred fishing craft of every kind.

That night we lay in at Whitestone Landing and the following morning ran our little craft down on the tide through Hell Gate to take her place with the Fleet in Gravesend Bay.

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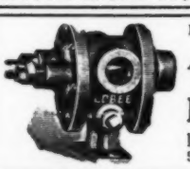
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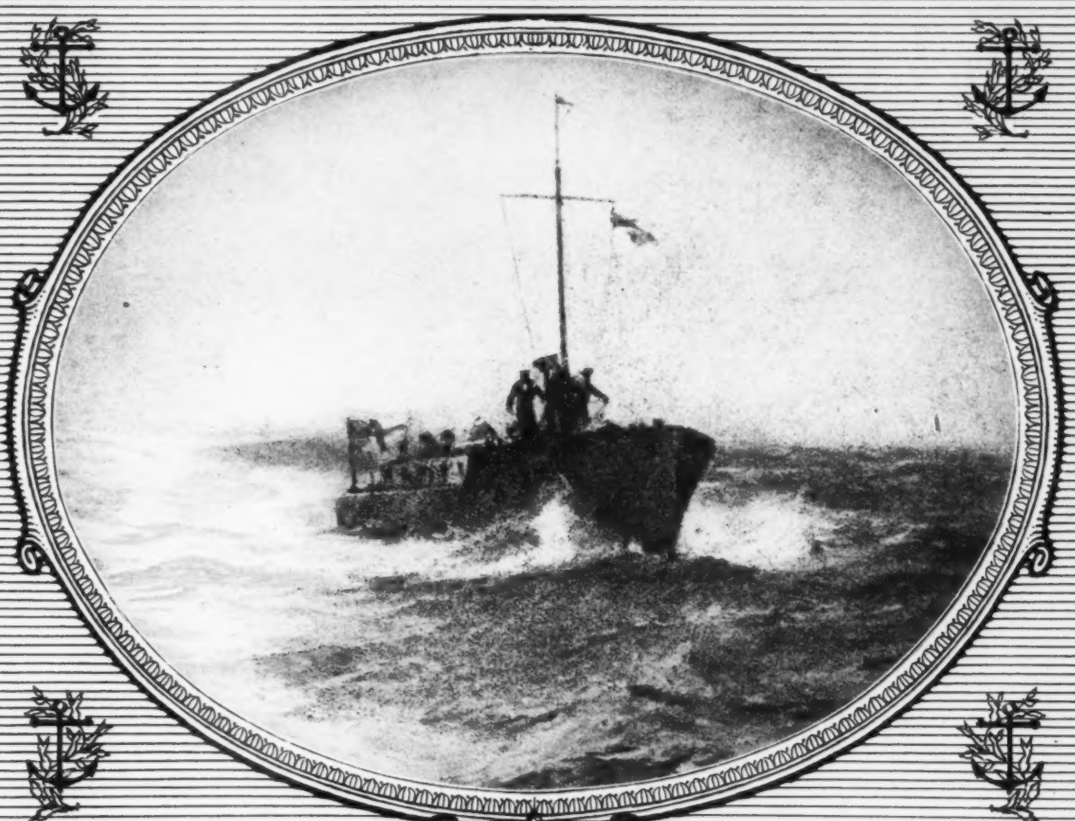

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A definite plan. (A first cost of engine governed by the greatest return to the engine owner.)	The same plan evolved.
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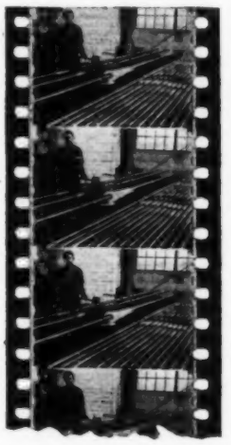

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from a drop of oil, producing power irresistible yet instantly responsive to the mere touch of one's finger—is doing world's work, is making history.

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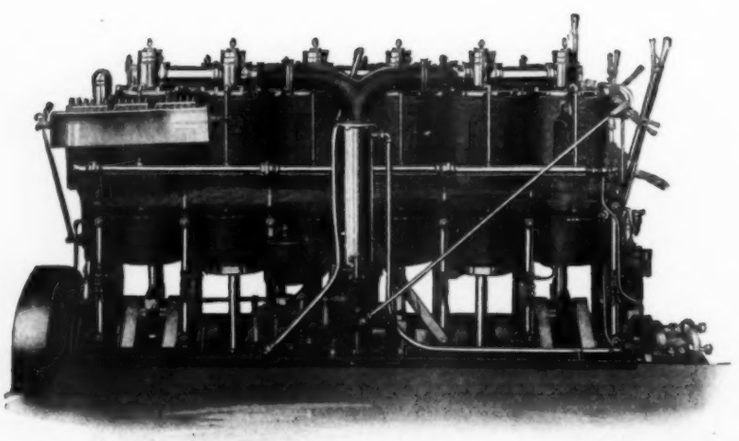

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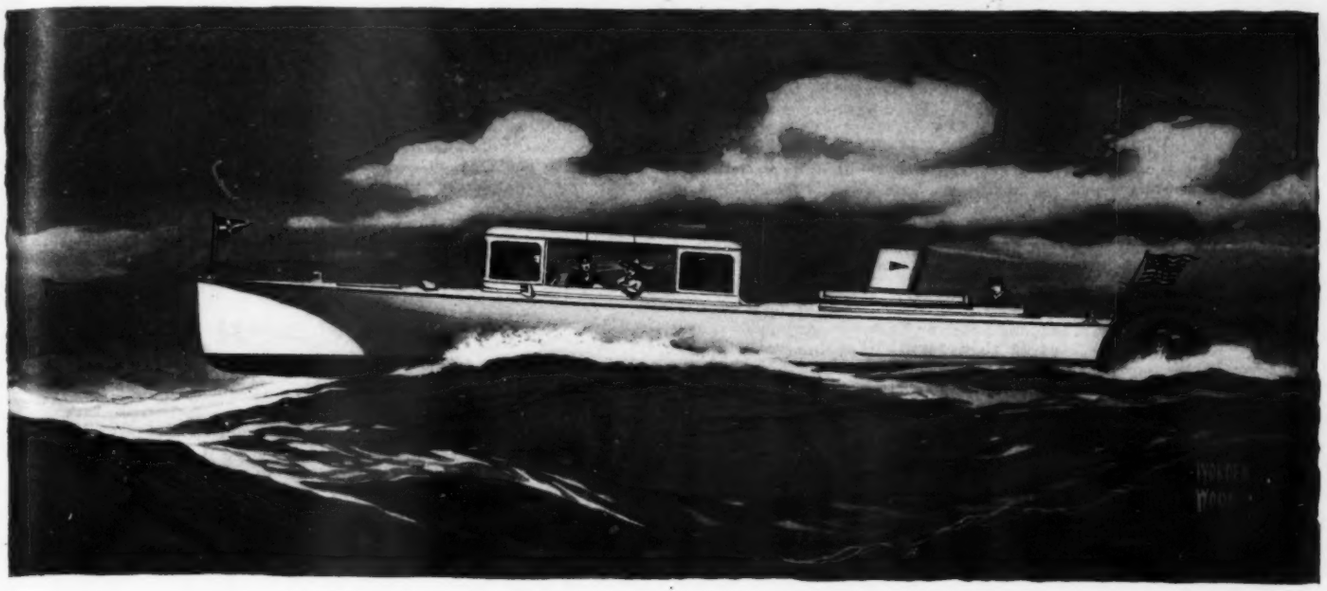

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This Albany Standardized Fast Runabout typifies the wonderful advance made in design, construction and equipment of boats of the runabout type.

Here is a boat capable of a speed of 35 miles an hour, can seat comfortably from eight to ten people. Furthermore, it is a remarkable boat from the standpoint of seaworthiness and staunchness.

By standardized methods of manufacture it has been possible to refine this boat to a hitherto unattained degree. Every item of equipment is in place, every consideration given to comfort and luxury in its appointments. Altogether a very exceptional boat.

Built either as an Open Runabout or as a Sedan Runabout, this 35 Foot Fast Runabout has proven itself to be a very desirable boat.

The illustration above gives an idea of the appearance of this boat as a Sedan Runabout. The illustrations below give an excellent understanding of its appearance as an Open Runabout.

A booklet has been prepared in which this boat has been illustrated and described. It will be a pleasure to mail you a copy immediately upon receipt of your request. Ask for Booklet No. 30.

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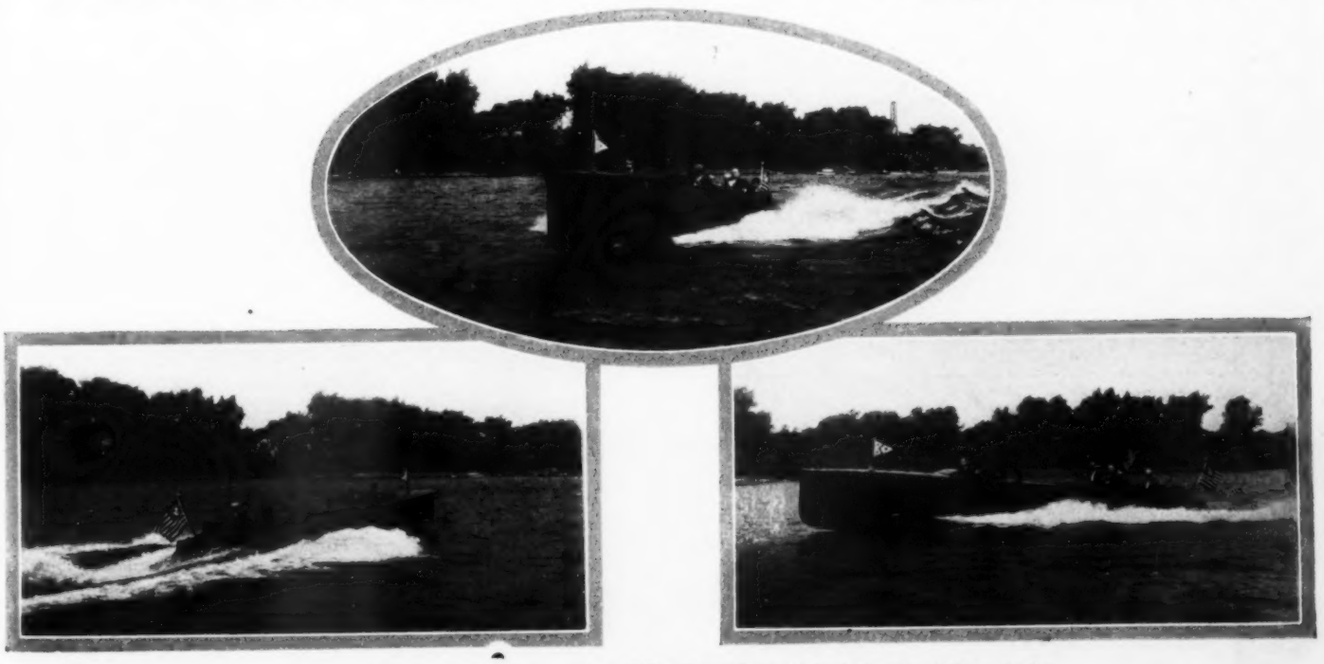

Practical Navigation for the Motor Boatman

(*Continued from page* 13)

the table is used much as was table 2. The degrees are written in the four corners of the pages and the minutes of angle in columns on the right and left hand side of the pages. A complete explanation on the detailed method of using the table is given on page 275 of Bowditch and to repeat that explanation here would be a waste of words. For the present the reader need concern himself only with the matter of getting the functions of an angle given in degrees and minutes, and similarly the matter of finding an angle to the nearest minute when the logarithm of a function is given. Seconds of angle will not have to be handled until the proposition of the time sight for longitude is undertaken later on.

To work mercator sailing by the use of logarithms should present no difficulties when the logarithms themselves have been mastered and the necessary facility in handling them can be readily obtained by going over the examples worked in the above mentioned appendix of Bowditch beginning on page 271. Problem 6 accompanying this article illustrates the logarithmic method of working mercator sailing in detail. The procedure is as follows. The difference of latitude in minutes, the meridional difference of latitude, and the difference of longitude in minutes are obtained exactly as they were in the problems worked by inspection. The logarithm of the meridional difference of latitude is subtracted from the logarithm of the difference of longitude in minutes, both logarithms being found from table 42. The remainder of this subtraction is the logarithm of the tangent of the course and the course is found by searching for its log tangent in table 44. When the course in degrees and minutes is found it is written down and while table 44 is open to this page the logarithm of the secant is obtained. The logarithm of the difference of latitude in minutes (not the meridional difference of latitude) is found from table 42 and added to the log secant of the course, the result is the logarithm of the distance. The distance is found from its logarithm by using table 42.

A good deal of practice will be required before real proficiency is attained in working middle latitudes, dead reckoning, and mercator sailing. About the best possible practice will be to work out problems graphically on the chart and then check them by computation. In this way real facility, both in handling the graphical and analytical methods will be acquired and this is what the navigator must have. It is not enough to know how to make the various computations and use the various kinds of charts, the real navigator not only knows how, but **he can do it.**

Problem 1. Find the course and distance from Fire Island Lightship to the whistling buoy off Barnegat. Given the table of deviations below, find the compass course.

Ship's Head by Compass.	Deviation	Ship's Head by Compass	Deviation
North ..... 0°	15° W	South .....180°	18° E
15°	15° W	195°	24° E
30°	13° W	210°	27° E
N. E. ..... 45°	11° W	S. W. .....225°	26° E
60°	10° W	240°	22° E
75°	10° W	255°	16° E
East ..... 90°	9° W	West .....270°	10° E
105°	9° W	285°	2° E
120°	8° W	300°	4° W
S. E. .....135°	6° W	N. W. .....315°	10° W
150°	2° W	330°	14° W
165°	8° E	345°	16° W

From the chart the distance is 57 miles and the course 221° (true). The variation in the vicinity of Fire Island is 10° W.

The magnetic course lies 10° to the right, or in a clockwise direction from 221° and is 231°. The westerly error was applied to the right because a "magnetic" course was being obtained from a "true" course.

Using the table of deviations: A compass course of 195° gives a magnetic course of 219° (this time easterly errors are applied to the right because "magnetic" courses are being obtained from "compass" courses), and a compass course of 210° gives a magnetic course of 237°. A compass course of 205° will next be tried. Inspection of the deviation table shows that the deviation would probably be 26° E on this course and the corresponding magnetic course would be 231°. The answer to the problem is: True Course 221°, Magnetic Course 231°, Compass Course 205°, Distance 57 miles.

Problem 2. Find the course and distance from Lat. 39° 18′ N, Long. 72° 11′ W, to Lat. 41° 12′ N, Long. 70° 20′ W by middle latitude sailing.

Position: Lat. 39° 18′ N Long. 72° 11′ W
Destination: Lat. 41° 12′ N Long. 70° 20′ W

Diff. of Lat. 1° 54′ = 114′ Diff. of Long. 1° 51′ = 111′

39° 18′
41° 12′
2)80° 30′

Middle Lat. 40° 15′ say 40°. Using 40° as the middle latitude, the diff. of long. of 111′ is found equal to a departure of 85 miles. The required course must have a diff. Lat. of 114 and a departure of 85.0. Inspection of table 2 shows that a course of 37° for a distance of 143 miles nearly meets these conditions.

Answer: Course 37° (N 37° E on old style card). Distance 143 miles.

NOTE:—The departure was obtained by looking for the diff Long. of 111′ in the distance column on the 40° page of table 2, the departure being taken from the "Lat." column.

Problem 3. Find the course and distance from Lat. 36° 31′ S, Long. 1° 41′ E, to Lat. 49° 37′ S, Long. 12° 37′ W by "middle latitudes."

Position: Lat. 36° 31′ S Long. 1° 41′ E
Destination: Lat. 49° 37′ S Long. 12° 37′ W

Diff. of Lat. 13° 06′ Diff. of Long. 14° 18′
Diff. of Lat. = 13 × 60 + 6 = 786′ Diff. of L'g. = 14 × 60 + 18 = 858′

The diff. Lat. and diff. Long. are too large to be handled by table 2, so will be reduced by dividing by a convenient number, say 3.

$\frac{786}{3} = 262$ $\frac{858}{3} = 286$

36° 31′
49° 37′
2)86° 08′

Middle Lat. 43° 04′ say 43°, departure corresponding to a diff. Long. of 286 = 209.2.

By inspection of table 2 the course having a diff. Lat. of 262 and dep. of 209.2 is 219°, distance 336. The real distance is 336 × 3 = 1,008 miles.

Answer: Course 219°, Distance 1,008 miles.

NOTE: A good coincidence of 262 as a diff. Lat. and 209.2 as a dep. could not be found, so the best obtainable coincidence was used. This was found on page 609, and at the head of the page the courses were 39° (141°, 219°, 321°). 219° was taken because southing and westing have to be made good.

Problem 4. Find course and distance from Lat. 31° 19′ N, Long. 170° 21′W, to Lat. 26° 02′N, Long. 173° 40′E, by middle latitude sailing.

Position: Lat. 31° 19′ N Long. 170° 21′ W
Destination: Lat. 26° 02′ N Long. 173° 40′ E

Diff. of Lat. 5° 17′=317′ 344° 01′
360° 00′

Diff. of Long. 15° 59′ = 959′

$\frac{317}{10} = 31.7$ $\frac{959}{10} = 95.9$

31° 19′
26° 02′
2)57° 21′

Middle Lat. 28° 40′ say 29°: departure corresponding to a diff. Long. of 96.0′ = 84 miles.

Answer: Course 249°, Distance 89 × 10 = 890 miles.

NOTE:—In this problem the 180th meridian was to be crossed, consequently the diff. Long. had to be obtained by adding the two longitudes and subtracting the sum from 360°. The course had to be read from the bottom of the page in table 2 because the "dep." was greater than the diff. Lat. 249° was chosen in preference to other courses on the bottom of the same page because southing and westing must be made in going from position to destination.

Problem 5. Find the course and distance from Lat. 52° 16′ N, Long. 54° 50′ W, to Lat. 56° 21′ N, Long. 48° 19′ W, by mercator sailing.

Position: Lat. 52° 16′ N meridional parts 3672.7 Long.: 54° 50′ W
Destination: Lat. 56° 21′ N meridional parts 4092.1 Long.: 48° 19′ W

Diff. of Lat. 4° 05′ Meridional diff. Lat.=419.4 Diff. Long. 6° 31′
Diff. of Lat. = 60 × 4 + 5 = 245′ Diff. Long. = 60 × 6 + 31 = 391′

Searching in table 2 for a coincidence of 419.4 in the Lat. column with 391 in the dep. column, the course is found to be 43°. Searching for the diff. Lat. in minutes (245′) in the Lat. column and taking the distance from the distance column gives 335 miles as the distance.

Answer: Course 43°, Distance 335 miles.

Problem 6. Find by mercator sailing the course and distance from Lat. 50° 08′ N, Long. 10° 01′ W, to Lat. 19° 03′ N, Long. 62° 15′ W.

Position: Lat. 50° 08′ N meridional parts 3469.0 Long. 10° 01′ W
Destination: Lat. 19° 03′ N meridional parts 1157.0 Long. 62° 15′ W

Diff. of Lat.=31° 05′ Meridional diff. Lat.=2312.0
Diff. of Lat. = 1865′ Diff. of Long. = 52° 14′
Diff of Long. = 3134′

log. 3134.0 = 3.49610
log. 2312.0 = 3.36399

course = 53° 35′ log tangent course = 10.13211
log. secant course = 10.22647
log. 1865 = 3.27068

distance = 3142 log distance = 3.49715

Answer: Course S 54° W = 234°, distance 3142 miles.

NOTE—The diff. Lat. diff. Long. and Meridional diff. Lat. are found as in the preceding problem. Logarithms of numbers are found from table 42 and logarithms of functions of angles from table 44. The student should note that 10 is added mentally to the index of the log. diff. Long. before the log. mer. diff. Lat. is subtracted from it and 10 is mentally subtracted from the log. secant course before the log. diff. Lat. is added to it.

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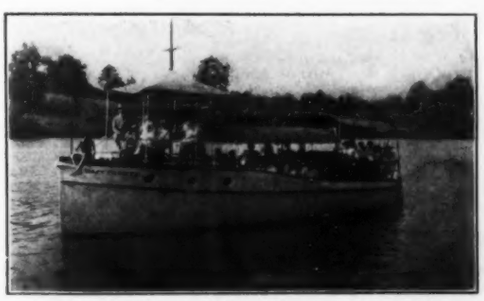

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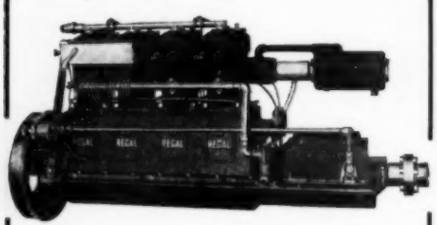

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Will Concrete Replace Wood?

(*Continued from page* 23)

sibilities of concrete for ships by giving space to a series of articles on this subject.

A Baltimore man built a reinforced concrete yacht eleven years ago. The craft, with a length of 65 feet and an 18-foot beam, in 1909 was one of the fleet of the Baltimore Yacht Club. The man who built it was convinced that if steel boats were seaworthy, a stone boat would give good service.

A reinforced motor cruiser was constructed by Ivan Widing, of Dorchester, Mass., a member of the Savin Hill Yacht Club of Dorchester. This craft is 41 feet over all with an 8-foot beam with a framing of steel angles, a 10-inch H beam forming the keel. Galvanized expanded metal attached to the framing holds the concrete, which has a thickness of 7/8 inch at the gunwale and 1½ inches at the keel. A sponson on either side at the waterline increases the total feet giving the vessel great buoyancy in a seaway, making her, in fact, practically unsinkable. The power for propulsion is derived from 25-30 h. p. four-cylinder Buffalo engine which gives a speed of 7½ knots. Either gasoline or paraffine may be used for running and the tanks hold 1,000 gallons or enough for a cruise of, say, forty days. Apparatus for developing moving-picture films is fitted up in the after cabin and in the main cabin forward special bunks with deep sides for bad weather are provided.

A recent advertisement in the Norwegian Shipping Gazette, translated, reads: "Fougner's Steel Concrete Shipbuilding Company. Lighters of steel concrete 100 tons dead weight can be delivered in from six to eight weeks. Seaworthy motor ships about 200 tons dead weight can be delivered in from three to four months. Larger lighters and motor ships up to 3,000 and 4,000 tons dead weight for delivery the first half of 1917."

In July, 1917, Jens Hauland, vice-president and general manager of a concrete product plant at Porsgrund, Norway, was in the United States exhibiting a 9-foot model of a boat built according to plans that the company is following in constructing concrete vessels of 200 tons capacity. This model was turned over to the United States Bureau of Standards to enable it to study the methods of construction. Mr. Hauland says that companies have been formed in Bergen, Norway, and Buenos Aires, South America, to build concrete vessels after the plans his company is using.

Without question, there is a great future ahead for reinforced concrete in ship construction. Necessarily the first attempts have been crude, and, therefore, have not always been entirely successful. However, we must not forget that all great inventions, especially in ship construction, have been the results of scientific development of ideas which were often introduced by laymen in very crude form, and which later, with the assistance of experienced marine engineers were transformed into the great successes of the present day.

The Why Not of the Automobile Engine

(*Continued from page* 35)

the lugs used on most automobile motors. It must be remembered that the "push" from the propeller is transmitted to the boat through the engine base and bed. Provision is made for meeting these conditions in all marine motors.

The thrust or push of the driving wheels of an automobile is transmitted from the axle to the frame, and does not reach the engine. In marine motors the thrust of the propeller is generally taken care of by a thrust bearing on the engine base, and some such scheme must be used when an automobile motor is installed in a boat.

The removable plates of the crank case of an automobile motor are as a rule in the bottom of the base. Who wants to turn his motor upside down to get into the crank case? At least it is necessary to raise the motor up from the bed when installed in a boat. The marine motor is provided with removable plates on the side above the base, so that the crank case is accessible without disturbing the rest of the motor.

Most automobile motors are provided with air-cooled exhaust manifolds. These are satisfactory in a car where they are in a continuous current of cool air. The motor in a boat is generally enclosed under hatches or in the cabin. Under these conditions the air-cooled manifold becomes too hot to be safe. In fact in some cases the manifold has been found at a red heat after several hours run. The only satisfactory solution of this difficulty is a water-cooled manifold.

Pure aluminum will not resist the action of salt water or even a damp salt atmosphere. It is gradually acted upon and disintegrated. This is overcome in marine work by using an aluminum alloy which is not affected by salt water.

The cylinder walls of marine motors are made thicker than is the practice with automobile motors, so that they can resist the action of salt water for a much longer time.

After considering all these difficulties and inconveniences of using an automobile motor in a boat somebody is sure to remember an example of such an installation that has been a success. True enough, there are exceptions to every rule.

All automobile motors are not built on the same lines, and there are a few that even resemble a marine motor in every detail. Then again there are boats with fine lines that are easy to drive and boats of the same size that cannot be pushed through the water at fair speed with any reasonable size motor.

The great majority of cases where an automobile motor has proven successful and reliable in a boat are installations of the heavier, slower speed motors in light, easily driven boats. These successful installations, when examined carefully, show numerous changes to adapt the motors to the new conditions.

Some boat owners are attracted to the automobile motor by the price at which second-hand motors can be purchased. Let these men stop and think a minute. Would an automobile motor in good condition (and for marine service they must be in perfect condition) be sold for say $50 when it could be used in another car of the same make without any alteration whatever?

The greater number of the second-hand automobile motors which are for sale have reached the end of their usefulness or they would still be turning the wheels of a car.

Do not fool yourself into believing that you can purchase an automobile motor for your boat for $50 that will give you the same service and satisfaction that a $500 motor especially designed for that service will render.

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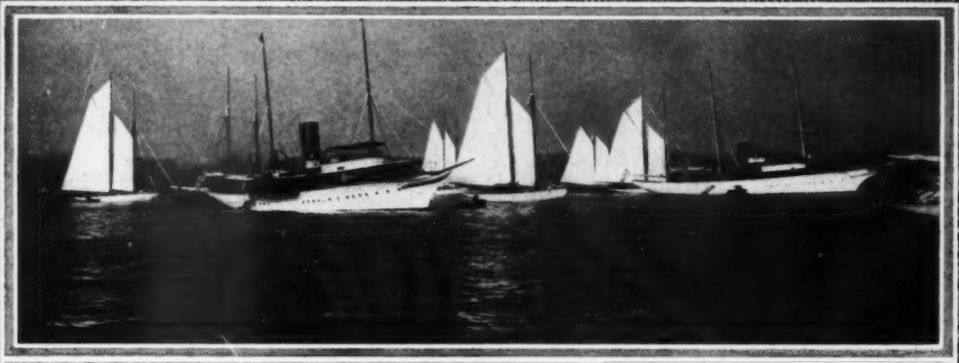

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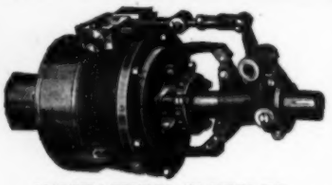

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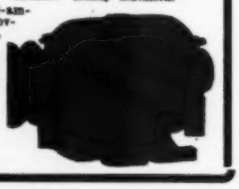

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Naval Birdmen in the Making

(*Continued from page* 10)

cer. A case dissimilar from that of the unknown civilian who appears before a signal corps examining board. Then too, it is not left to the enrolling officer to accept a man. That is the prerogative of the Bureau of Navigation which draws conclusions partly from the fitness report and partly from the comprehensive data inscribed by the candidate on his application blank, and the manner in which it is written.

Following the mental examination comes a period of watchful waiting wherein the importunate navyator besieges the departmental yeomen for news of his case. In two weeks' time, if all goes well, his papers are returned and the chances are about sixty-forty that he has been accepted for service in the Naval Reserve Flying Corps, with a rating of seaman, second class, though he may have held anything up to a warrant grade in the Coast Defense branch.

But he is still a long way from becoming an aviator. First he waits for his detachment papers, and then he goes home "on inactive" for a period of a month or more. Here is his opportunity to brush up on some of that trig of which he talked so glibly, and to accustom himself again to the high collar of officers and gentlemen—for never again will he wear the comfortable, open-throated jumper of the Navy garb. Henceforth he must dress and act like a commissioned officer, even though for the time of his tuition he receive the pay and rating of a Sea. 2c. Perhaps this will have been changed by the time these words arrange themselves on the printed page, for there is talk of making the pay of naval air students that of the army flying tyro—$100 a month instead of $36.50. The uniform will remain the same, a flight ensign's, with gold braid on the cap and spiral puttees—and only the magic shoulder straps and the ranking of a "tumble" from enlisted men lacking.

And then comes the eight weeks' course in the ground school at the Massachusetts Institute of Technology, where the navigation student must adhere to Navy discipline at its strictest and keep up with the standards of Tech at their highest. Better for him that he reach the ground school in a condition physically perfect, for in addition to the mental training, he must undergo a course of exercise which is the equal of that prescribed for Plattsburgh, and in a course so short it is unwise to lay oneself up even for three days with creaking bones and muscular lamentations.

But what, besides calisthenics, cutter drill, and practice in the art of commanding men in infantry formation must a student at this school learn? Well, to begin with, there's naval indoctrination. And the meaning of that? Navy customs and regulations—such little things as the first duty of a commissioned officer in reporting aboard ship; the time for lighting the smoking lamp and for dousing lights in the orlop; the number of sidebuoys to be piped when a "Vice-consul or consular agent (where he is the only representative of the United States)"—I quote a mystifying passage from Regulations—sets foot on the boarding ladder. Difficult enough to distinguish among highboys, sideboards, and sidebuoys in a dry Navy, or know why they should be piped, let alone learn how many of them are to be piped and where. Extraneous though it may seem from the science of flying, the reason for acquiring such knowledge is not hard to find. There may come a time when the full-fledged aviator is placed with his flying boat aboard a cruiser, and it is not meet that he should show himself ignorant of the formalities of the Navy in the presence of his brother officers.

On the whole, one would have to look far to find a more interesting course than that given at the ground school. Electricity, radio, gunnery, meteorology, and navigation—these are five subjects to delight the mind of young America. And better still, the rigging and structure, the upkeep and repair of aircraft, the theory of flight, aircraft instruments, lectures and practical work on aeroplane motors of allied and enemy manufacture. Could one ask for anything more fascinating? And then to top it off with aerial photography, seamanship, and the semaphore code! Surely, there is no corner of a man's intellect that can remain unquickened under such a comprehensive course.

Eight weeks of these subjects, with every detail made clear by some of the best instructors, academic and military, in the country, and a student may be said to have learned something. While absorbing it he has arisen at six and worked at one thing or another almost incessantly until ten at night, with an average of two evenings a week to his own devices. Entering the school, he has been placed in Flight D, in which he has remained for two weeks, to advance to Flight C, and so up the scale to the graduating flight, A. All the time he has been observed closely for the outcropping of any trait of personal deportment, character, or morality, which would unfit him for service among officers and gentlemen, and if he has fallen short in any of these, or in his studies, or general aptitude, or in the elusive personality he is given an honorable discharge from the Navy (slang for busted out) and is subject to draft as a private of infantry.

But the chances are that he has realized his responsibilities and opportunities—and has graduated with the forty-nine other keen, forceful, intelligent young men who make up each flight. And then for a three months' course in elementary flying at Pensacola or another of the Naval aviation bases, with the reward of a commission as flight ensign as an immediate goal.

Let us, however, leave our former Naval Reservist at this point, since nowadays the only way to fly is to fly, and no amount of telling about it will lift the reader from his feet. In the second paragraph of this article the young man proved his sense of equilibrium to be good, and subsequently did his best to show that there was nothing wrong with his personality; to graduate from the ground school he must have had ready intelligence, initiative, character, resource, industry, and reliability—wherefore it is a foregone conclusion that he can fly.

And who couldn't, with such an incentive? . . . To be one of Uncle Sam's eagles of the sea, one of the ten thousand who will drive the German vulture to its lair.

Personalities

(*Continued from page* 38)

his plant for $300,000. He has just made a shipment to Norway of 1,000 gears, the order for which he obtained through an advertisement in MoToR BoatinG. He is a hustler, wide awake and energetic, and has won his success through sheer ability and hard work.

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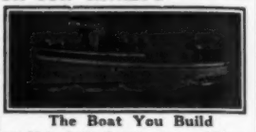
which tells you all about it. You can build a 20 ft. launch for $30 from patterns that you could not buy at any factory for less than $150, or you can buy the complete frame and build this 50 ft. cruiser shown in the picture for less money than you would have to pay for the cheapest 25 ft. finished cruiser you could buy.



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Co-Operation—Why Not?

(*Continued from page 7*)

the automobile industry as a whole, but to co-operate to the fullest extent with all manufacturers of internal combustion engines and their accessories.

The spirit of co-operation in the S. A. E. is most pronounced—in fact all of the members of this society are welcome to visit to the fullest extent any automobile factory whose engineering corps are members of this society, and you may rest assured that their visit will be pleasant and they will be given all the information they might desire.

Do the members of the National Association of Boat and Engine Manufacturers co-operate with one another? If they do it is in the mildest type of co-operation. When the engineer of one of the marine motor manufacturers calls upon a competitive manufacturer he is looked upon as "Captain Kidd, Jr." If the manufacturer should be somewhat broad-minded he might condescend to take his visitor through the factory "on high," but you may rest assured that he does not offer to co-operate or to have his engineer meet in conference with any of his competitor's engineers. He is under the impression that somebody might see a few lines upon the drafting boards or might endeavor to steal his very secretive ideas. This seems to be the general idea which permeates the whole motor boat industry, and the result is that each and every individual manufacturer is fighting his own battle alone and spending considerable of his time worrying and jealously guarding his so-called secrets.

Now let us just touch for a minute the sales departments of the motor boat industry. A large percentage of them spend fifty per cent. of their time knocking their competitors, twenty-five per cent. of their time trying to figure how to stick the knife into their competitors and the balance to sell the product.

Don't you think this industry would be a whole lot better off and make wonderful gains if each and every manufacturer was on a friendly basis with his competitors, willing to co-operate with them to the fullest extent?

In summing up let us again say that to put the motor boat industry where it belongs to-day we must first start at the fountain head—our National Association. Elect officers for this association who have the necessary initiative and aggressiveness and the executive ability to bring together each and every manufacturer whether large or small; get them all working to one common end—and that is to make motor boating the one best sport in the universe.

A Surface Propeller Working Boat

(*Continued from page 35*)

being above water.

(3) Propeller shafts were entirely above the bottom of the boat, where they could not be damaged by submerged obstructions, and were carried in large, lubricated bearings bolted to the main structure of the hull instead of at the end of a stout arm.

(4) The surface propeller, unlike the screw propeller of speed boat practice, was free from cavitation in rough water.

(5) There were less important advantages in maneuvering, and of a mechanical nature—the propellers, for instance, being visible at all times, and, if damaged, being quickly replacable from the boat while she was afloat.

These first surface propeller boats had speeds of from 10 to 20 statute miles per hour and proved most efficient. Their performance in shoal water, where the growths of the eel-grass were so thick as to leave practically no water in sight, was hardly short of marvelous, the boats running through this growth with the speed apparently unaffected.

The boats were developed in sizes up to 30 feet in length, while the boat illustrated is a late development of the type, a 48- x 10-foot V-bottom cruiser, designed for a working speed of about 12 miles per hour. This craft, while heavily built and able, has a draft, including propellers and protecting skeg below, of only 19 inches of water. At the same time her reasonable speed, in weeds or out of weeds, is limited only by the type and size of power plant installed. This boat is driven at a speed of approximately 12 miles by a pair of Murray & Tregurtha four-cylinder 5- x 6-inch, 16 to 24 h. p. heavy-duty engines turning the propellers at approximately 650 r.p.m., a very inexpensive installation and an efficient result. By the use of larger motors, still running at moderate revolutions, it would be easy to increase the speed of boats of this type and size economically to from 15 to 18 or 20 miles per hour.

This particular boat, with her sister ship, was designed for service in a hot climate. Cabin and sleeping quarters are forward, amply ventilated with raised skylights and ports insect-screened throughout. The open cockpit is very large, protected by a permanent standing top with strong side curtains. Engines and cooking stove are installed in the cockpit, the former protected by removable engine covers. The boats are painted navy grey. Decks are canvased. The photographs were taken before the proper propellers were fitted. With the correct propellers in this class of boat there are many indications of an efficiency superior to that of the screw propeller boat of similar weight and power.

The installation of surface propellers in larger boats of this class with low power is significant of the number of directions which this development is taking, and as I said earlier, we look forward with all faith to the time when we shall discard other hull types for these boats as well and use displacement hulls in which only sea sled principles of design are employed. That, however, is part of another and longer story.

Helpful Hints

(*Continued from page 32*)

The extra connection can be placed in the tank by a plumber and the two valves and pipe arranged as shown. The forward pipe projects into the tank several inches or sufficiently to allow the desired amount of reserve. In using the gasoline is first drawn from the pipe A until the level at the pipe is reached, then the valve B is opened and the reserve supply of fuel drawn upon. The amount of gasoline retained should be sufficient to enable the motor boat to reach the nearest source of supply.

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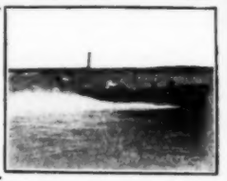

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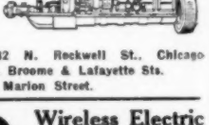

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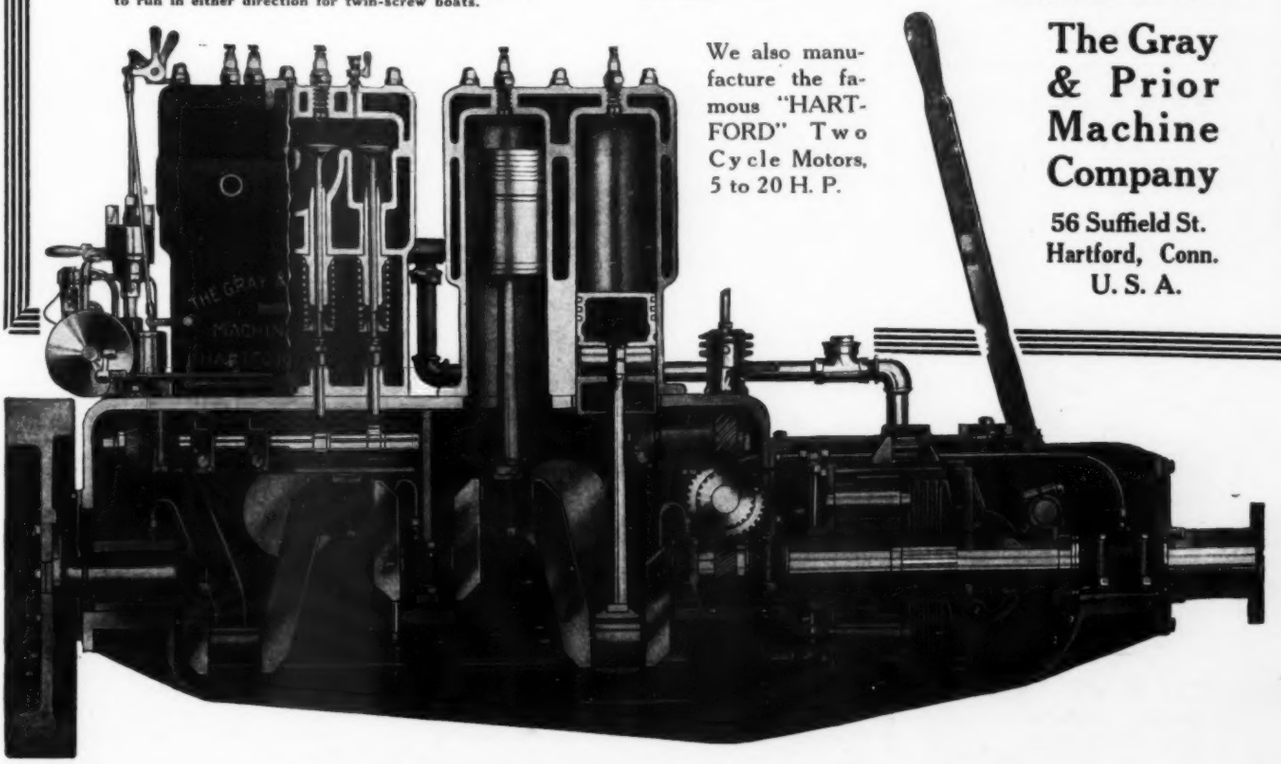

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EUGENE M. SHERMAN
Box 3 Bellevue, Wash

Jackies Who Have Never Seen the Sea

(*Continued from page 16*)

cessive steps of training for their naval apprentices that just as the carpenters got well started in the boat-building stage of their work the gas-engine men found themselves about ready to help, to assist in the woodwork, plan the mounting of the engines, the installation of propellers and crankshafts. The skeletons of two shapely motor boats are now fast nearing the point where it is time to begin thinking about finishing touches. A crew of carpenters and a crew of engineers are assigned each boat. The rivals will launch these children of their handicraft on the earliest spring day the ice lifts in the lake.

Such a course in motor boat training has been deemed by Ensign Dodge comprehensive and in logical order. Some of the bluejackets who knew gas-engines technically before they enlisted in the navy have been rounded out at Dunwoody in three months and are now at sea—not at sea at sea, either, but perfectly at home at sea. Others, novices to start or those whose experiences was incorrectly learned or superficial, require four to five months and in times of peace they would be held longer.

"It was surprising how we instructors were misled about the capabilities of individual naval students," remarked one of the assistants in the gas-engine laboratory. "With few exceptions all the men coming here from Captain Moffett of the Great Lakes Naval Station had monkeyed around gas-engines for some little time before they enlisted. We questioned them all the day we began the course, and it was easy to spot those who knew what they were talking about. On the other hand, a lot of men started to tell us how long they had worked around a garage, and for them we held out little hope. For two or three weeks we had to correct a lot of wrong ideas and working methods held by these wise ones, who seemed indifferent, listless. Then suddenly some of the backward pupils, about a dozen of them began to look alive. We had almost given up ever making motor boat pilots out of them. But some shot ahead with the leaders of the class. It was amazing. I tried to think how it had happened, and finally the reason dawned on me. The apparent indifference was nothing more than tedium brought about by the process of *unlearning*. When we had pulled these misinformed men back to where they began and had given them a fresh start with new stuff, interesting and essential, they were stimulated to give a better account of themselves. Men I originally rated as blockheads are now making marks with the best-making 3.6 when 4. represents faultless work."

The men are marked on theory, practice, conduct, and log-book. Their conduct is under observation outside training hours as well as at the Institute. At the hotel lodgings, after 4 p. m., or after the evening mess if the men do not leave Dunwoody until then, petty officers are in charge until taps, 10 o'clock, and strict naval discipline rules as in midocean. Instead of returning immediately to their barracks, bluejackets are privileged to remain in classroom or laboratory after supper, to work at experiments or to write up their log-books. The latter contain the daily records of exercises and sketches of machines or parts.

Early emphasis by all instructors was put upon the vital importance of log-book thoroughness.

"Don't let a day go by," warned the chief instructor of the motorboat men, "without entering in your log-book a complete record of what you have done and what you have seen. Let it be a diary."

At the outset several of the recruits were frightened into overscrupulousness in this detail. One man wrote:

"Spent Saturday afternoon sewing buttons on a shirt. Also did my washing."

The gas-engine men at Dunwoody are not confined to a single laboratory, for there is related work of considerable weight with which they must be acquainted. They are given a special short course in electricity as I have already indicated in mentioning their instruction in starting and lighting. Additionally, they are given a survey of blacksmithing, coppersmithing, carpentry (as in boat building), and of machine-shop methods. This condensed training in other departments is necessarily confined to a few fundamentals, but it gives the gas-engine man a timely insight into means of making or repairing parts. True, gas-engine men on first line battleships or big cruisers may have no need for such knowledge because the larger vessels of a fleet are already outfitted with blacksmiths, with coppersmiths, carpenters and machinists. But suppose the motor boat apprentice is detailed to a destroyer or a little submarine chaser? He will then find his side information highly useful.

"The hardest thing I've had to teach my motor boat men on the lake," says Chief Machinists' Mate Stewart, "is how to approach a dock properly. Some started to come alongside downstream. Some others worked upstream all right, would shut off the power too soon and begin to drift away. Now and then a man would bang the prow into the dock as if he wanted to sail right through. I did that one day myself and they gave me the laugh, but I told 'em quick what my old captain used to say to me, 'Don't do as I do, do as I say!' "

All five boats have now been pulled inside the Dunwoody buildings for the winter, but work with them goes on just the same. Their crews are overhauling the engines to the last nut and bolt, and are preparing to put on new hulls.

Dunwoody gas-engine jackies who have already demonstrated their fitness for a rating have been transferred to Columbia University for the special four weeks' training on actual submarine-chaser apparatus, as those not ordered to motor boat work on the big ships will be detailed to the chaser engineer crews. Just before being recommended to Columbia the candidates are personally examined by Ensign Dodge who knows what rough water means in a small boat, for he was executive officer of the first destroyer flotilla which navigated the Straits of Magellan, on the world tour made by the American navy in 1908. Of one recent candidate he asked:

"How do you know you can stand heavy seas on a 110-foot boat?"

"For seven years, sir," was the reply, "I rode bucking mustangs in Arizona." . . . The man was recommended.

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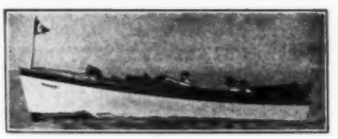

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Are light, at the same time strong; accomplished by using semi-steel castings, high carbon steel shaft, bronze bearings, high class workmanship

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Guarantee Speed, Strength, Control. Catalog Free
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Speed 25 miles per hour Guaranteed

20' x 5' Standardized V-Bottom Runabout
$1500 Complete
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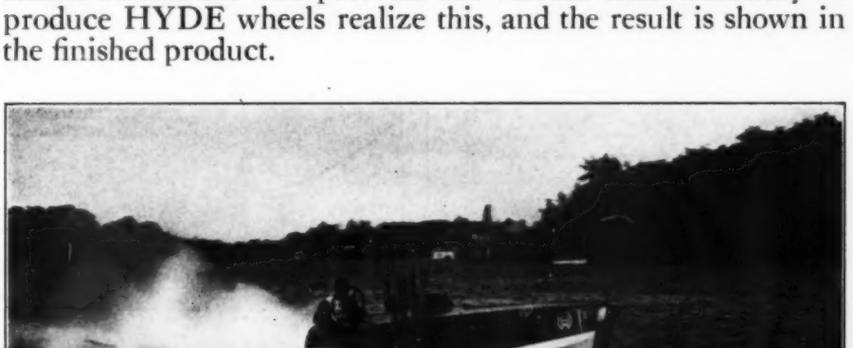
SEPARATELY they are qualities to be desired by all, but when combined, their value increases a hundred-fold—they form a rare jewel. CONSISTENT EFFICIENCY—Efficiency at any time and all times—day after day, month after month, year after year—that is the kind of efficiency that is moulded into

Hyde Turbine Type Propellers

From drawing board to finishing room, step by step, HYDE propellers are made with this idea as an ultimate goal. The skilled mechanics who perform the various tasks necessary to produce HYDE wheels realize this, and the result is shown in the finished product.



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Winner Gold Challenge Cup 1917. Equipped with a Hyde.

HYDE TURBINE TYPE PROPELLERS were used by the following Gold Challenge Cup winners—

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MARBLEHEAD ANTI FOULING GREEN BOTTOM PAINT

FOR STEEL OR WOOD STAYS CLEAN

Gives the greatest efficiency with the smallest fuel consumption.

Semi-enamel white for topsides.

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"Bites Quick" *Holds Fast*

Correctly designed — exceptionally strong. Shank of solid wrought iron, forged in one piece; no "pinhole" to weaken it. In holding position it lies at an angle of 55° to the flukes, as per Navy Specifications. One-piece head—no pockets to bring mud on deck—and its "tripping fin" absolutely prevents anchor from dragging "flukes up." Heavily galvanized by hot process. Proper sized shackle with each anchor. At your dealer's or write us.

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Mfrs. of the Famous Maxim Motor Boat Silencers.

Cruising Comfort

—a graceful, sturdy craft that ploughs the sea with perfect ease and limitless power; grips the water tenaciously yet glides along without lost motion, entirely free from toss of tempest or "whip" of wind.

Completely able and supremely sea-worthy—a pride and pleasure every knot of the trip, bringing you safely home with keen anticipation for the next cruise. That's the story of

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Built to order from your plans or our designs, as you prefer. Full of comfort and character,—"A Country Home Afloat."

Everything in boats from K/D to complete outfit. If quality counts with you, write us. You'll like our complete story.

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North Tonawanda, N.Y.

CHEAPEST POWER

is furnished by an ordinary marine gasoline or kerosene engine supplied with gas by a

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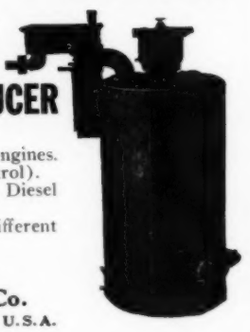

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Smaller first cost, and fuel cost than Diesel engines.
Nine years successful use in 10 different countries.

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Self-Locking STEERERS

Best Steerers Lowest Cost All Types in Stock

Price, $40 Complete

Effect great economy in use. Positive control — no back lash Installed in DISTURBER IV

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"SAND-DAB," 16½' long, 4½' beam, 11" draft. 4-cylinder, 4-cycle motor housed in amidships giving range of speed from a trolling speed to 12 miles per hour.

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Let us help you plan your boat for use in Southern waters. We have many attractive designs and now is the time to get started. VALLEY boats are Quality boats—up to the minute in design and having the finest of materials and workmanship.

Cruisers, Runabouts, Hydroplanes, Rowboats

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YOU CAN'T DROWN! YOU CAN'T CHILL!

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It is a one-piece garment, completely enveloping the body; can be slipped into in less than a minute. It supports the wearer for an indefinite period, at the same time keeping the body *warm, dry* and *comfortable.*

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SILENT VALVE DRIGGS

A Marine Engine which combines

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Incorporates a silent and thoroughly efficient rotary valve which is always gas tight and silent and can never stick.

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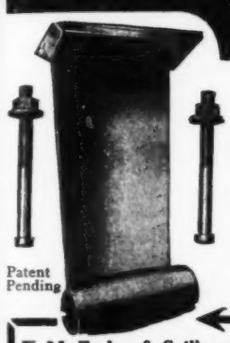
Easiest to Install
The "OFFSET" Strut



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No Bushings—No Babbitt

Simple, strong and trouble proof. Lasts as long as the boat. Long bronze shaft bearing that outwears any other kind. Made of best manganese bronze complete or with steel arm for fresh water use.

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The entire bearing swivels in the arm.

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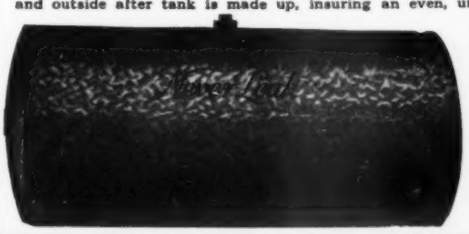
for Storing Gasoline Water Air or Oil

A "Safety-First" Tank for Motor Boats and Yachts

"Never-Leak" Tanks are made of one length of suitable gauge sheet steel, with heads and tappings welded in the shell. Galvanized thoroughly inside and outside after tank is made up, insuring an even, unbroken coating. Welded construction throughout. A large stock on hand for immediate delivery.



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The Complete Boat

Possesses every refinement of a custom-built boat with ready made production economy, promptness of delivery and standardization of parts. Operates just like a motor car. Powered with any motor you wish. Write for illustrated bulletins.

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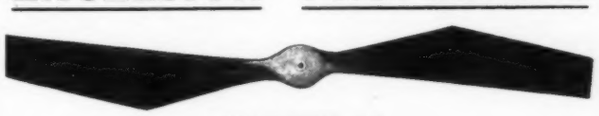

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The propeller without an equal. They are superior to any propeller produced. They are used extensively by all the leading Aviators. Large stocks and prompt shipments. NO GRADES. THE BEST AT THE SAME PRICE FOR ALL. BOOKLETS FREE.

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WE can save you time and money on Towing, Weedless, and Reversible Propeller Wheels, Reverse Gears, Universal Joints, Rear Starters, Underwater Exhausts, and a hundred and one other motor boat accessories.

We manufacture the best line, and they give the best results, at prices right. Send today for our large free catalog.

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HIGH GRADE
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ACCESSORIES

THE LUNKENHEIMER CO.
"QUALITY"
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High Tension Magneto
Original in Design
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B & B Propeller

Whether your boat is a submarine chaser, a patrol cruiser or a smaller motor boat, maximum speed and efficiency are war-time necessities. Whether you desire efficiency for pursuit, racing, or just to beat the high cost of fuel, a B & B Propeller should be on the end of your shaft.

1 to 3 Miles Increase Guaranteed

The B & B is strictly a high-efficiency wheel. We guarantee to increase your speed 1 to 3 miles per hour. We have sold thousands of wheels under this guarantee. Every buyer has had the privilege of returning the wheel. That alone is sufficient proof of B & B efficiency.

Order a B & B today. Tell us the size, type and power of your boat so we can recommend the right size wheel.

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Standard for 25 Years

Launches, Dories and Boats of All Kinds Up to 40 Feet

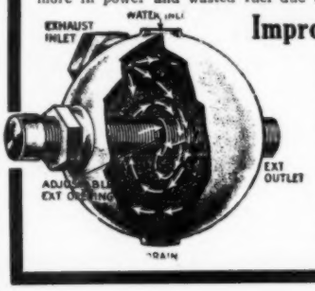
TOPPAN BOAT MFG. CO.

81 Washington St., N., Boston, Mass. Factory: Medford, Mass.

Silence!

The law compels you to have an effective silencer on your boat.

Many boat owners think they are beating the law by conducting the exhaust under water or some other complicated method, but it is a fact that they lose more in power and wasted fuel due to the back pressure than the cost of an



Improved Thermex Silencer

The Improved Thermex increases your revolutions and saves fuel because it absolutely eliminates all back pressure. It silences the noise of the exhaust by cooling the gases with water and provides for their gradual expansion to atmospheric pressure.

Cannot clog, nor collect salt; water cannot flow back to cylinder. No heating, no odor. Used free or under water—adjustable discharge. Lightest, best and cheapest to install. *Write today for descriptive booklet and prices.*

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It might happen in midstream. This is the risk you run when you have to **guess** at the power supplying your electrical equipment. But if you install a

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Model 301 AMMETER
On Your Bulkhead

You can tell exactly, and at all times, the rate of charge or discharge of the battery. You know **before it is too late** whether your battery is being maintained in the condition which will assure you perfect service.

Write us—let us tell you about it.

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FRANCKE FLEXIBLE COUPLINGS

are installed in place of rigid couplings—no extra thrust bearing required—their use prevents

HOT OR WORN BEARINGS
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by providing for the misalignments which may always be expected in every boat due to the boat changing shape and weaving in a seaway.

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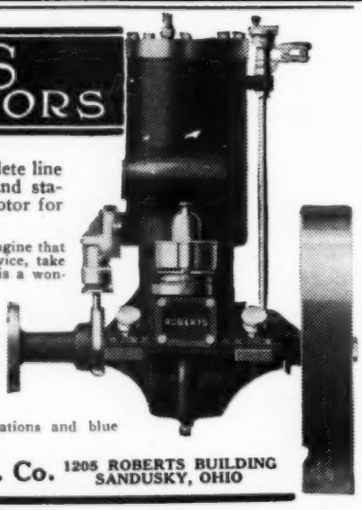
ROBERTS MOTORS

We build a complete line of motors, marine, aircraft and stationary. We have the right motor for your boat at the right price.

For a Heavy Duty Fisherman's engine that will stand the hardest kind of service, take a look at this Roberts Motor. It is a wonder for power, strength and dependability.



The Bore is 6", stroke 6½", developing 8 H.P. at 300 R.P.M. and 10 H.P. at 400 R.P.M. Operates on either gasoline, kerosene or distilate. Furnished with either Jump Spark or Make-and-Break Ignition.

Write today for prices, specifications and blue prints.

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"RED SPOT" SEARCHLIGHT

RED FOR DISTRESS

MOST PRACTICAL MOTOR BOAT SEARCHLIGHT MADE

WHITE FOR SAFETY—for navigating dark and unfamiliar channels, avoiding rocks, picking up buoys, making landings, etc. A powerful penetrating light that carries far and insures safety at night.

RED FOR DISTRESS—simply press a button and produce a brilliant red light that is as effective as red fire for a distress signal and is visible for miles.

The Red Spot can be operated on regular lighting system, storage or multiple dry battery. Diameter 5½", height 10". Easily removed from base for stowing away.

No. 1615 Red Spot Searchlight complete with 6-8 volt lamp, weatherproof cord with copper terminals attached. **$6.50**

Order a "Red Spot" through your dealer, or direct from us. We also manufacture running lights and cabin brackets.

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"Practical Motor Boat Handling"

is the **best** book on the subject ever written.
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THE NEW BOOKS WILL BE OUT SOON!

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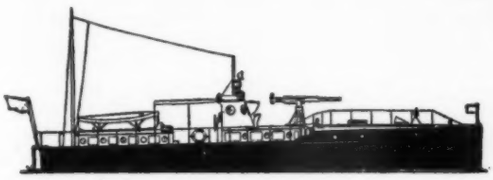

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We are prepared to accept orders for Duplicates from Yachtsmen who will appreciate what this achievement means.

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WICKER-KRAFT Yacht Furniture

Fit out your yacht or motor boat with the genuine Wicker-Kraft, the original wicker furniture to be designed especially for high grade boats of all types.

There are special types of Wicker-Kraft for cabin cruisers, day cruisers, express runabouts, launches, rowboats and canoes. Each design is just suited to its purpose, and each piece possesses the excellence of design, materials, workmanship and finish which has made Wicker-Kraft the most popular brand of furniture in the marine field.

Wicker-Kraft is regularly used by the leading builders of high class boats—builders who cater to the most discriminating boat owners and who buy only the best products the market affords. Among these are Albany Boat, Great Lakes, Niagara, Seabury, Elco, Fay & Bowen, Luders, Matthews, Lawley and many others.

Write today for illustrated catalog and prices. The popular idea of enclosing a life preserver under the seat of a chair is an original Wicker-Kraft feature.

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IMPROVED MOTOR BOAT CLOSET

Figure 1404

Dimensions: 18 x 18 x 11" high to top of bowl; 2½" cylinder. For above or below water line.

The best little closet on the market today, possessing many of the advantages of the large size toilet. All brass and porcelain. Oak seat and cover.

All prices subject to market advances, which are continually changing.

Price $25.00

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Pioneer Specialists in Marine Sanitary Fixtures

Since our advertisement appeared in the first issue of MoToR BoatinG, December, 1907, hundreds of Curtiss fixtures have been installed in motor cruisers and yachts of all sizes, including some of the finest boats launched within this period.

The Curtiss line is exceptionally complete, varied in type, size and price to meet every possible requirement. Each model has been designed in accordance with our wide experience in boat work and can be depended upon in quality, service and durability no matter whether it is our highest or lowest priced model.

With Pump

Lining and Fixtures Nickel-plated. Porcelain Bowl. Mahogany or Quartered Oak Case.

Cock on pump swings upward, thus preventing breaking of bowl. Soap-dish is porcelain and removable.

No. 5
Height, 19 inches.
Width, 19 inches.
Depth Closed, 6 inches.
Quartered Oak Case, Each...$42.50
Mahogany Case, Each..... 44.00

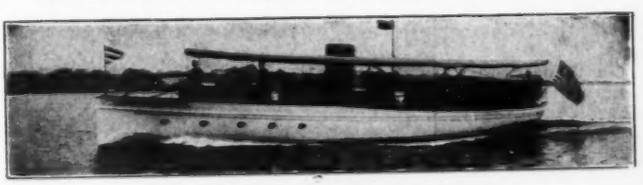
Fig. 1392

THE J. H. CURTISS CO. 2 South Street, New York

20th CENTURY Gasoline Motors

2-Cylinder—6½" x 8½"—15-20 H.P.—400 R.P.M.
4-Cylinder—6½" x 8½"—40-50 H.P.—400 R.P.M.
6-Cylinder—6½" x 8½"—65-75 H.P.—400 R.P.M.

Strictly high grade four-cycle engines, built for heavy duty service.



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NEW YORK YACHT, LAUNCH & ENGINE CO. :: Morris Heights, New York City

CAPE COD POWER DORY CO., 455 Main St., Wareham, Mass.

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- 16-Foot Lake and River Boat
- 17-Foot Sail Dory
- 21-Foot Runabout
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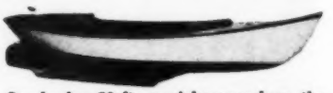
- 14-Foot Size for Outboard Motor
- 17-Foot Launch



Our leader, 20 ft. special power dory, the safest little family boat built. Will stand the ocean waters.

Write for literature on boat interested in. NO PATTERNS OR K. D. FRAMES.
All these boats are of Standardized Construction. It means a better boat at a lower price.
Don't build to order when you can get a better boat of Standardized Construction at lower cost.

FINISHED CRANK SHAFTS

P. H. GILL & SONS FORGE AND MACHINE WORKS, BROOKLYN, N. Y.

We are furnishing them to some of the leading marine engine builders. Carbon and Alloy Steel, Heat Treated to your own specifications. We grind all Pins and Bearings. Forged, machined, and finished complete in our own plant. Let us quote you.

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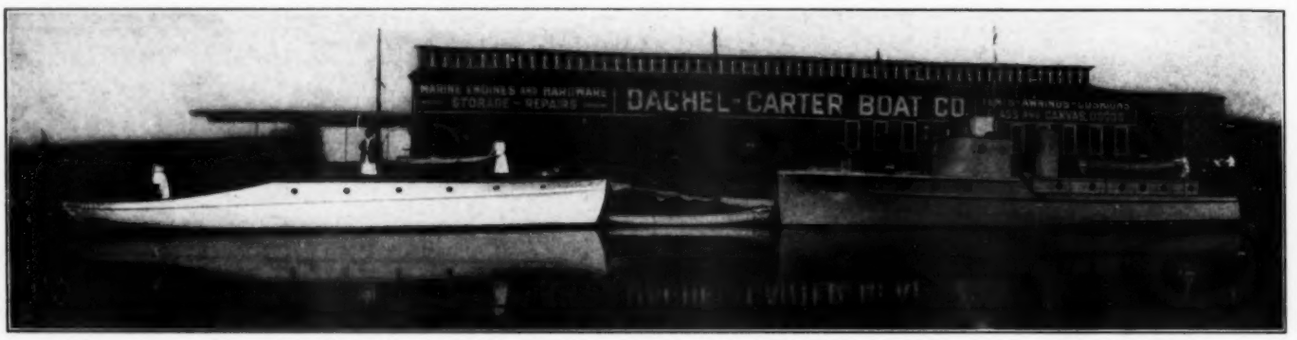
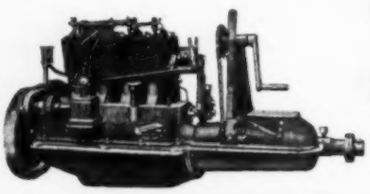


Twenty-five years' experience designing and building all types and sizes of pleasure and commercial boats—large, well-equipped shop—experienced workmen—excellent shipping facilities—low overhead expense—good boats at right prices. Get our specifications and figures for your new boat, and you will never regret it. There is a reason.

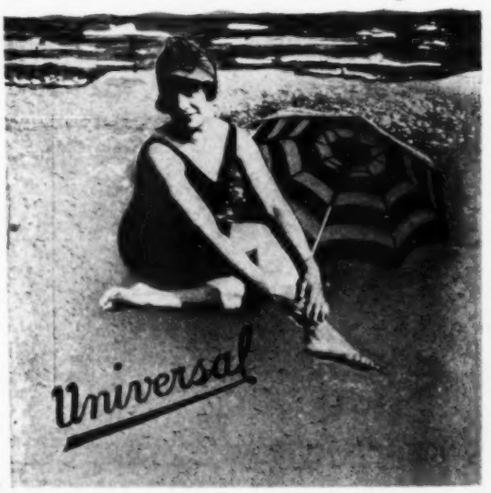
DACHEL-CARTER BOAT CO., Canal St., Benton Harbor, Mich.

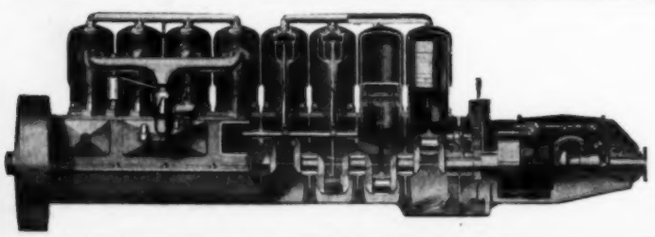
THE 1918 UNIVERSAL

Has all the attractive features of the 1917 model with a few refinements. It is the ideal motor for one class racers. Just as suitable for work boats or for trolling. Get Bulletin No. 25 and learn the features of this popular motor.



Universal Motor Co.
Oshkosh, Wis.





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Four Cycle Type. 5 to 200 Horsepower. Made in 2, 4, 6 and 8 Cylinders.

For Cruising, Racing, Fishing, Freighting

Smooth, well-balanced and symmetrical in design, powerful and thoroughly dependable in operation, they are the embodiment of the best engineering effort.

OVER 11 YEARS' SUCCESSFUL SERVICE THROUGHOUT THE WORLD.

The strongest possible guarantee by a company thoroughly responsible, financially, stands behind every NIAGARA. You will never regret it if you

PUT THE POWER OF NIAGARA IN YOUR BOAT.

NIAGARA MOTORS CORPORATION
524 Ellicott Square BUFFALO, N. Y.

YACHT
CARPET
Established 1849 LOUIS DUSENBURY & CO., 229-233 Fourth Ave., N. Y. City

Where Elco Boats Are Used

Evening Sun.

NEW YORK, TUESDAY, DECEMBER 18, 1917.—

Italian Motor Boats Baffle Foe

Small but Swift Naval Craft Do Their Part in Defending Venice From the Invaders.

WITH THE FRENCH ARMIES IN ITALY Dec., 18.—Italy's defence of Venice has proved the fighting qualities of the motor boat. Propelled by powerful engines and capable of almost incredible speed, armed with torpedo tubes or light guns, this new type of naval fighting craft has done much to help the Italians keep back the Teutonic invasion.

It was one of these fast motorboats, according to reports, which recently passed the barriers of the Venetian Gulf, cruised out across the Adriatic, slipped through the mine fields of the Gulf of Trieste, entered the harbor, blew up the Austrian battleship Wien—and got safely away.

There have been numerous other instances where the little wasps of the sea have harassed enemy dreadnoughts and cruisers. Their great speed makes them extremely difficult to hit, and their torpedo sting is just as deadly as that of a supersubmarine.

The motorboats, every one around Venice firmly believes, will keep the Queen City of the Seas beyond range of the enemy's guns. The more [illegible] of the inhabitants in the Venetian Gulf [illegible]

LIEUT. OAKM[illegible]
D. S. O. A[illegible]
Grands[illegible]
W[illegible]

An ELCO Chaser Signalling to a French Battleship

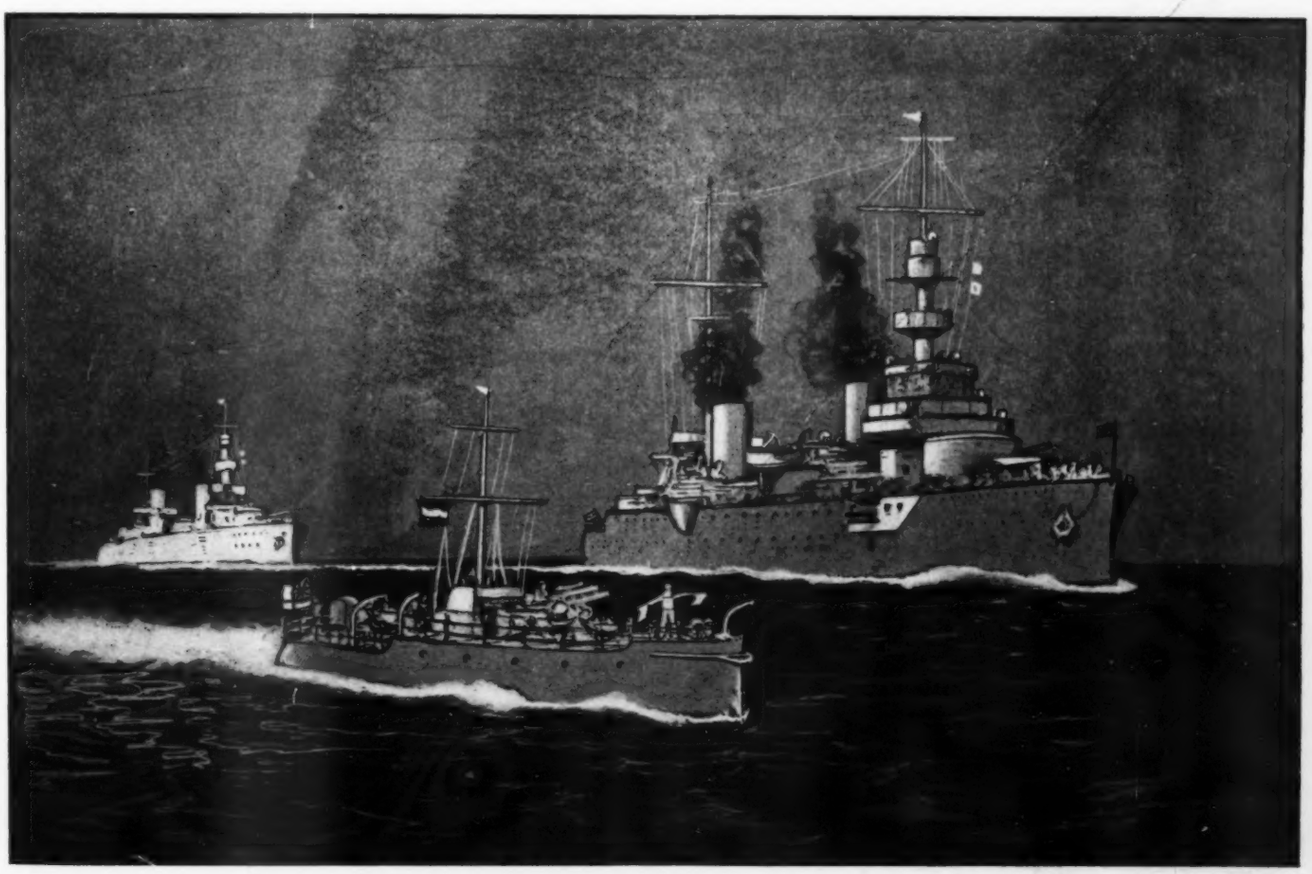
It is interesting to note that the hundreds of Submarine Chasers which are contributing in large measure to the making of world history today were built by the same organization that has been producing standardized Elco motor boats for the past quarter of a century.

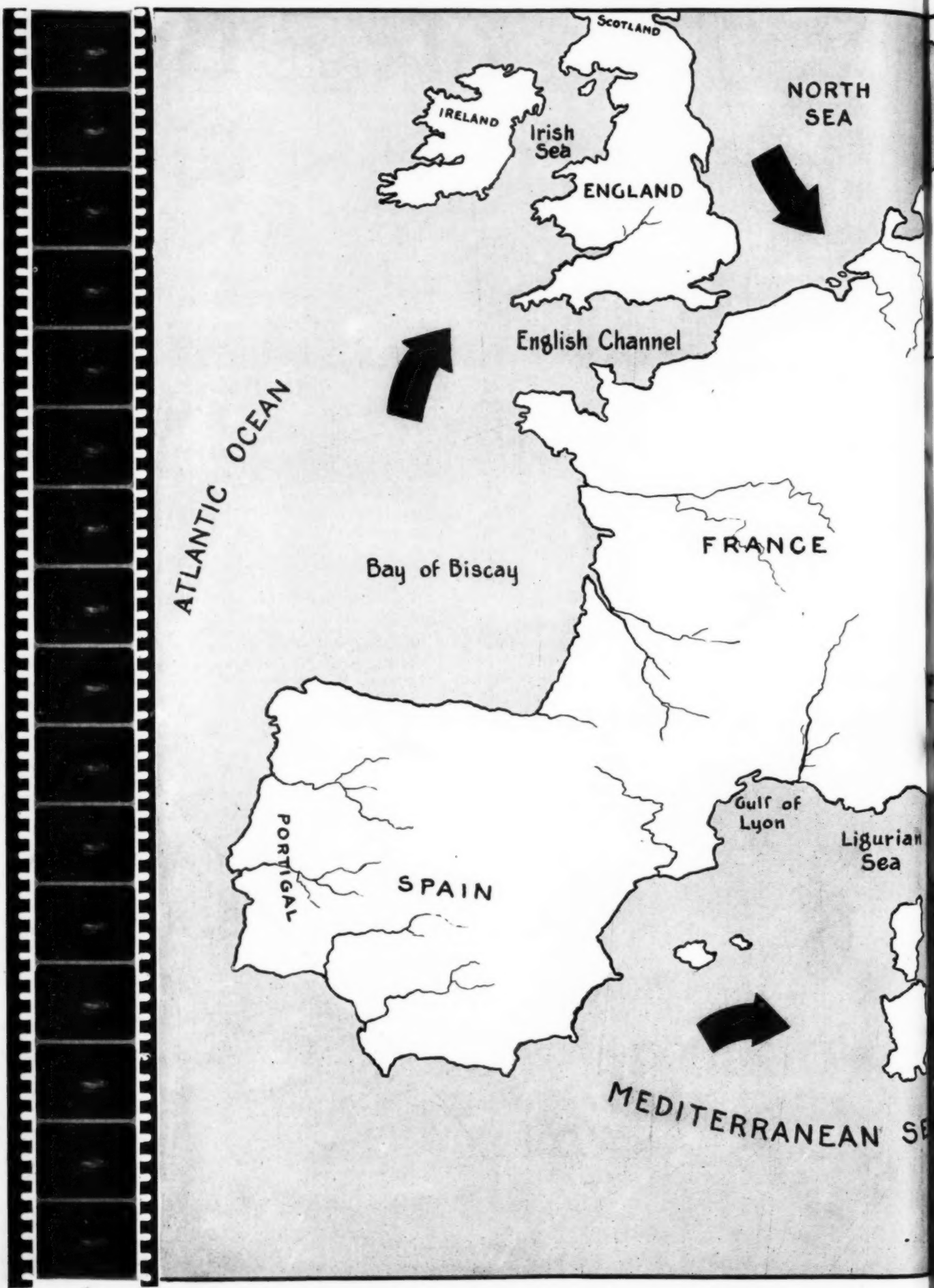
The thorough success of the 550 Elco "M.L.'s" supplied to the British Admiralty in 1915 and 1916 is proven by the 1917 orders for thirty more of these 80-ft. Chasers for the British Admiralty, forty-two for the French Navy, ninety Chasers for the Italian Government and sixteen 110-ft. Chasers for the U. S. Government.

On the following pages you will see where the 80-ft. Elco Submarine Chasers are being used.

The ELCO Company, MAIN OFFICE AND WORKS 201 AVENUE A **Bayonne, N. J.**

New York Office: 13 Pine Street



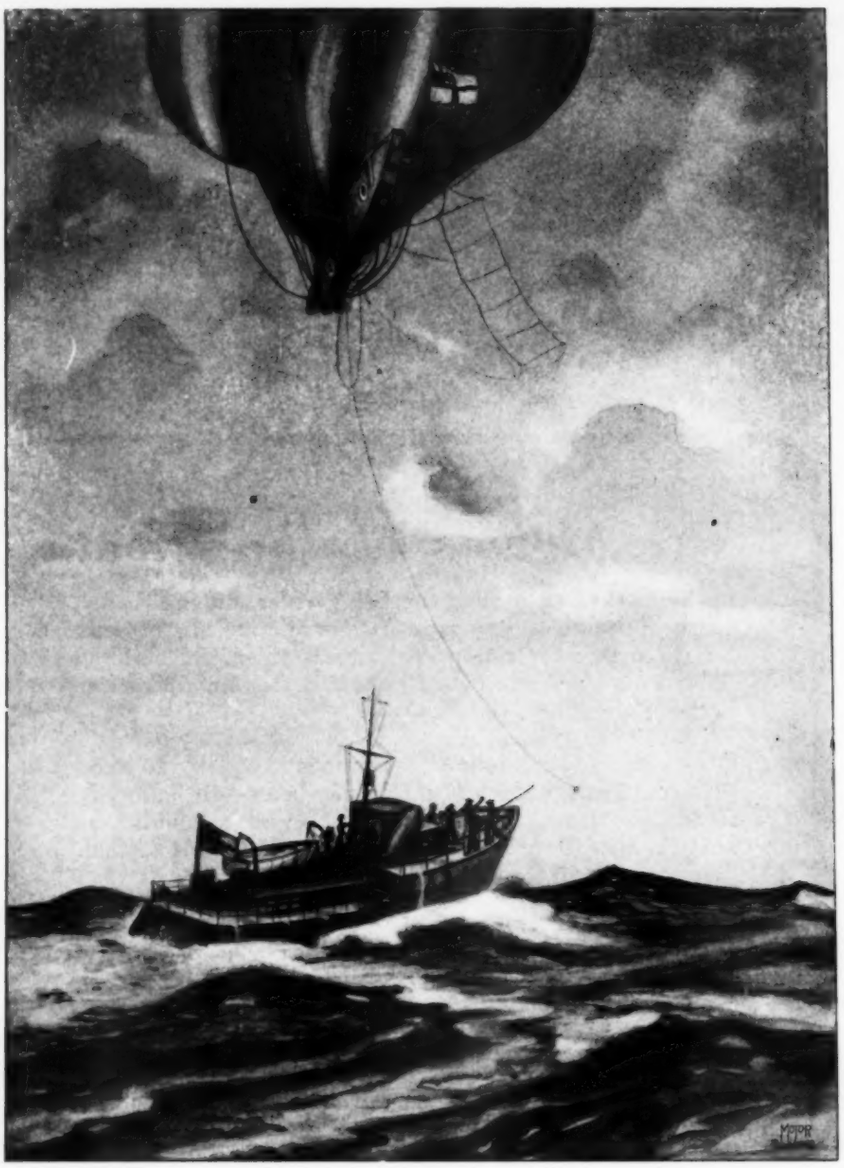

SCOTLAND
IRELAND
Irish Sea
NORTH SEA
ENGLAND
English Channel
ATLANTIC OCEAN
FRANCE
Bay of Biscay
Gulf of Lyon
Ligurian Sea
PORTIGAL
SPAIN
MEDITERRANEAN SE

The Movies of the Fleet

In the North Sea, around the British Isles, off the French coast, in the Mediterranean, the Adriatic and the Aegean Sea, Elco standardization in the form of several hundred Submarine Chasers, all identically alike, is doing its service in the cause of humanity.

Only standardization could have made it possible to build such uniform efficiency into so many boats—in fact, only standardization could have made it possible to build these boats at all within 488 working days—15 days less than the time allowed for the completion of the contract.

When the war is over, and the details are released from the veil of censorship, it will be found that the Elco Submarine Chasers have performed one of the really big things of the war.



A British ELCO Chaser receiving a despatch from an Air Ship in the North Sea

The story of the Elco Submarine Chasers has been called one of the Romances of the World War. Most of their deeds are now secrets of the war offices of the nations which are using them. Time will make these secrets available for the enlightenment of the world.

The task of building 550 eighty-foot boats in 488 days is simply beyond comprehension. We ourselves did not realize its difficulties until we had gotten well under way. And no other organization in the world could have been so well prepared—in facilities or in experience—due to our consistent adherence to the policy of standardization for more than two decades.

The ELCO Company, MAIN OFFICE AND WORKS 201 AVENUE A **Bayonne, N. J.**

New York Office: 13 Pine Street

"NORMA" BALL BEARINGS

(Patented)

Performance must be built into a boat or engine —it is a thing inherent, not alone in the equipment as a whole but also in every part, every construction detail. Failure of a so-called minor part or minor detail, impairs performance as surely as a break-down of the boat as a whole.

Failure of ignition or lighting system may result from a failure of a bearing in magneto or lighting generator. To safeguard against which, makers of these electrical accessories of the highest grade—of maximum performance capacity—have standardized on "NORMA" Ball Bearings.

Be SURE. See that your Electrical Accessories are "NORMA" equipped.

THE NORMA COMPANY OF AMERICA

1790 BROADWAY NEW YORK

BALL, ROLLER, THRUST AND COMBINATION BEARINGS

Badenhausen Co.

Manufacturers of

Marine Water Tube Boilers

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San Francisco, California, 438 Rialto Building
Vancouver, B. C., Taylor Engineering Co., Ltd.

The WRIGHT Engine for Your Boat

KEROSENE

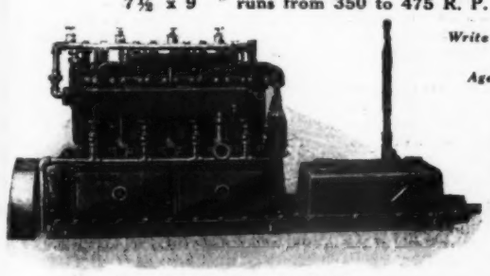
The ultimate solution of the fuel problem. Saves *more than half* of fuel expense, without sacrificing flexibility, power or reliability.

The Wright Kerosene Engine is thoroughly perfected. The kerosene is perfectly *gasified* before it enters the cylinders. It burns clean, free from carbon or lubricating troubles. No smoke or odor in exhaust.

Valves in cylinder heads. Make and break ignition. Bosch Low Tension Magneto

3-Cyl.	6	x 7½",	22-30 H. P.
3-Cyl.	7½	x 9 ",	35-45 H. P.
4-Cyl.	6	x 7½",	30-40 H. P.
4-Cyl.	7½	x 9 ",	45-60 H. P.
6-Cyl.	6	x 7½",	45-65 H. P.
6-Cyl.	7½	x 9 ",	70-90 H. P.

6 x 7½" runs from 400 to 550 R. P. M.
7½ x 9 " runs from 350 to 475 R. P. M.



Four Cylinder Kerosene Engine

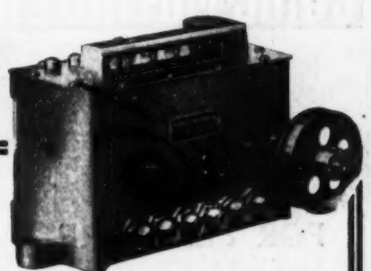
Write to-day for full details.

Agents Wanted.

WRIGHT MACHINE COMPANY

Owensboro, Ky.

Oil Is Cheaper Than Engines



A cent's worth of oil at the right place would often save ten dollars' worth of repair work. Perhaps you have never failed to supply the oil, but your responsibility to your engine does not end until you have provided the surest possible means of getting that oil to the right place, at the right time.

Manzel Forced Feed Oilers

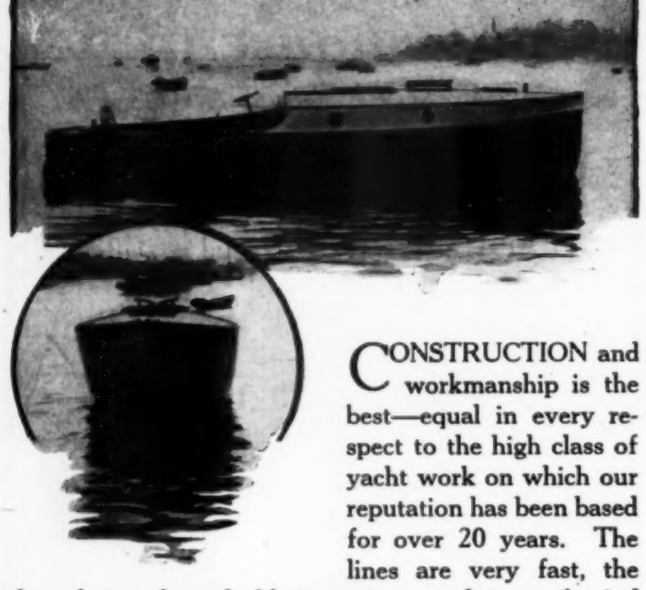
furnish the most dependable system of lubrication known. They can never fail because the oil is forced through each feed under pressure by a powerful pump which is driven by the engine itself. Manzel Pumps are made in a complete variety of sizes and styles, from one to fifty feeds, to fit every kind of marine engine manufactured. Any style of drive.

Write today for copy of this free booklet on lubrication. You'll find it well worth reading.

MANZEL BROTHERS COMPANY
295 Babcock Street
Buffalo, New York

San Francisco Office
356 Market Street

27 Foot Cabin Cruiser



CONSTRUCTION and workmanship is the best—equal in every respect to the high class of yacht work on which our reputation has been based for over 20 years. The lines are very fast, the launch is safe and able in severe conditions of wind and sea, and it has a large cockpit and very comfortable accommodations below decks. It is equally adapted to day service or cruising.

STEARNS & McKAY CO.

MARBLEHEAD, MASS., U. S. A.

Burn Kerosene
IN YOUR MOTOR

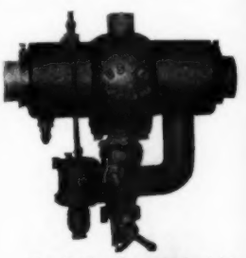
USVCO

Get the same amount of power for $3 or $4 that you are now getting from $10 worth of gasoline, and

Increase Your Motor's Flexibility

Easily attached to any 1" to 3" carburetor, the Olsen Vaporizer burns clear kerosene to the last drop. This kerosene reaches the cylinders as a dry super-heated gas that burns as clean as a lean gasoline mixture. Equally efficient on high, low or medium speed motors, the Olsen has never failed to prove satisfactorily its claim to be superior to any other kerosene burner made.

Adopted as standard equipment by several marine motor manufacturers for 1918.



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FOR PLEASURE—WORK—SPEED

Each type of motor-boat requires a power plant of suitable style, horse-power and model, according to dimensions of hull, purposes used for and speed desired. The selection of the most suitable motor should not be guessed at but should be the subject of careful consideration by experts. We manufacture the right motor for any power boat, whether used for pleasure, passenger traffic, heavy duty purposes, or fishing. Thousands of customers regard us as MOTOR BOAT HEADQUARTERS. By filling in the coupon below, you may have the services of our expert engineering staff absolutely free.

Marine engines in all sizes from 2½ to 30 H.P. both two and four-cycle models. Portable Motors for Outboard attachment in two distinct models. Use the coupon now, giving particulars of your Boat or the kind of motor you are interested in and get free catalog, information and advice by return mail.

THE CAILLE PERFECTION MOTOR COMPANY
21 CAILLE BLDG. DETROIT, MICHIGAN, U. S. A.

THE CAILLE PERFECTION MOTOR CO.,
21 Caille Bldg., Detroit, Mich., U. S. A.

Gentlemen:—Please send to me, absolutely Free, information as checked below: I understand this information will be treated in confidence by your Engineering Department and will be used in giving me advice as to the best and most economical power plant.

Row Boat Motors	Inboard Engines
[] Caille 5 Speed	[] Work Type
[] Neptune	[] Pleasure Type

Dimensions of boat—it is very important to give these.

Length.....ft. Beam.....ft. Draught.....ft.
Purpose used for: [] Work [] Pleasure
Speed desired.....miles per hour.

Name.....

Address.....

"SANDS" Sanitary Fixtures

Correcting Error in List Prices of "Commercial" Closet Printed in Our December 1917 Advertisement in "Motor Boating". The List Prices of $59.00 and $60.00 for the "Commercial" Closet Here Shown Are Correct

THE "COMMERCIAL" PLATE S-2070. (Copyrighted.)

The "COMMERCIAL" Closet is especially designed for use above the water line only. If it is **placed near** the **water line** we would **suggest** the **use** of our **"Keno" automatic back** water check valve. **This closet is strong, well made, and designed for heavy duty.** Consists of **vitro-adamant** flushing rim **oval bowl, galvanized iron valve box,** mounted on **galvanized iron base plate. Composition** quick opening supply **flush valve** with coupling for I. P. connection to pressure system. **Galvanized malleable iron** operating lever with **composition axle** and **valve.**

Heavy oak seat and cover with heavy cast brass post hinges, metal parts painted white, N. P. trimmings **$60.00**

Metal parts painted white, N. P. trimmings, oak seat without cover **$59.00**

Net weight, 115 lbs. Approximate shipping weight, 160 lbs. Space occupied, 21"x17".

A. B. SANDS & SON COMPANY
1849 Sixty-nine Years of Quality. Largest Manufacturers in the World of Marine Plumbing Specialties **1918**
22-24 VESEY STREET NEW YORK, U. S. A.

MAKE THE DURKEE BOOTH AT THE MOTOR BOAT SHOW YOUR HEADQUARTERS

A Visit to Our Downtown Store

The Home of Trade Mark D Marine Hardware

only takes 15 minutes on the Subway, from the Forty-Second St. Station and will amply repay for the time expended.

Cabinet Hardware, Locks, Knobs, Hinges, Catches, Flags, Mops, Sailing Lights, Caulking Cotton, Oakum, Clinch Rings, Nails.

CHAS. D. DURKEE & Co. Inc.

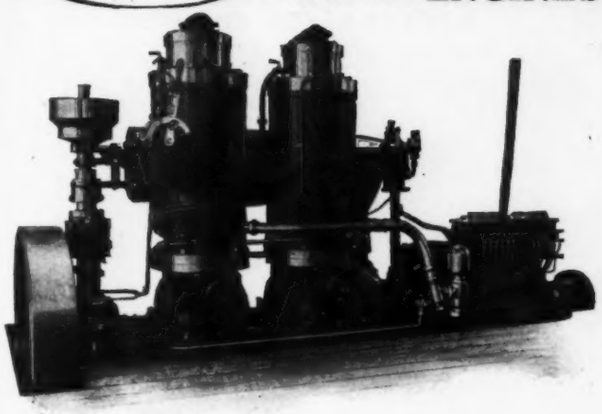
Mfrs. Marine Hardware and Motor Boat Specialties

2 and 3 South Street, New York City.

Brass and Galvanized Goods, Grasmere, S. I., New York City Machine Shops, Mop, Broom and Flag Factories, New York City

d. 25c. to cover cost of mailing 1168 page Catalog or thru your dealer free

Kahlenberg HEAVY DUTY CRUDE OIL ENGINES



Positive Governor Control from no load to full load. Will run idle any length of time and pick up full load instantly without losing a single impulse.

You carry only one kind of fuel (crude oil) which is used for starting and operating.

Built in sizes 60 H. P. and up.
Send for descriptive circular today.

Kahlenberg Standard engines in medium and heavy duty types are made in sizes from 2 to 54 H.P. and we would strongly recommend them for operating on KEROSENE, SOLAR OIL and GAS OIL. You ought to know more of the exclusive advantages the KAHLENBERG offers you. "Send for catalog."

Write today for full details.

KAHLENBERG BROS. CO., Manufacturers

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The MARINE Automatic ENGINE

AUTOMATIC power satisfies the most critical owner. It is reliable—and is obtained at minimum cost. The engine itself is built to do hard work—to stand the strain of constant use—so upkeep expense need hardly be considered.

The **Automatic** is a thoroughly practical engine. It has independent cylinders with removable heads, it has adjustable bronze bearings, a lubricating system that is dependable at all times, an enclosed speed governor. It is a clean, compact engine that is easy to care for and operate.

Let us tell you more about the **Automatic.** Specifications of any size—30 to 250 H.P., two to six cylinders—will be sent upon request.

The Automatic Machine Co.

BRIDGEPORT CONNECTICUT

Enlist YOUR Motor Boat in the Safety First Squadron

Don't let next season find you again exposed to that ever present danger of fire or explosion due to leaking fuel. Find out now about the

"JASCO TANK"

and just what it can do to put a real element of SAFETY into YOUR motor boating. Jasco Tanks are made of the finest selected steel. They are seamless, tinned and tested and will "stand up" under the roughest usage. They keep the gasoline where it BELONGS.

Made in sizes and styles to suit any type of motoring craft. We will be pleased to send you details, together with our full color Marine Signal Card.

JANNEY, STEINMETZ & CO.

Main Office: PHILADELPHIA

New York Office: HUDSON TERMINAL BLDG.

"Sands" Marine Sanitary Fixtures

THE TWO BEST CLOSETS EVER OFFERED FOR THE PRICE

"KNOCKABOUT"—Plate S-34
(Patented—Copyrighted)

The "Knockabout" improved Pump Water Closet, Vitro-Adamant round flushing rim Bowl, 2½" combined supply and waste pump. "Sands" Patent Automatic Safety Supply Foot Valves, and "Sands" Patent Back-water Check Valve.

Pump rough, finished trimmings, oak seat and cover..... $52.50
Mahogany seat and cover, add.... 1.50

"WINNER"—Plate S-2061
(Patented—Copyrighted)

The "Winner" Pump Water Closet. Vitro-Adamant Round Hopper Bowl, oak seat, N. P. brass hinges, 2½" supply and waste pump. "Sands" Special quick opening supply valve.

Plate S-2060 Fixture as described with oak seat..... $24.00
Plate S-2061 Fixture as shown with oak seat and cover..... $25.00

Plate S-126

The "Glenora" Composition flat way sea cock.

	Price
¾ inch	$2.25
1 inch	3.00
1½ inch	5.25
2 inch	8.00

Sizes 2½ inches and 3 inches also made.

Small Vitro-Adamant Corner Lavatory only 12" on side, with Nickel-Plated Plug, Stopper Chain and Stay, Nickel-Plated Faucet, Trap, Standing Soap Dish, N. P. 707 Supply.

Pump complete as described.

$28.00

Plate S-3381

Owing to the abnormal high prices and scarcity of material and labor, selling prices necessarily are advanced to meet conditions, ranging from list prices as not up to 50% advance over list based upon cost.

A. B. SANDS & SON COMPANY

1849 *"Sixty-nine Years of Quality"* 1918

Largest Manufacturers in the World of MARINE PLUMBING SPECIALTIES

22-24 Vesey Street New York, U. S. A.

FOR SALE HALF A BOAT

A BOAT is only half a boat without first class fittings. Forget, for the moment, the joy, service and safety such fittings afford. Some day you'll sell your boat, and if it is well equipped with WM Marine Hardware you can get more for it. For 70 years WM has stood for the best and most economical Marine Hardware. It's your safeguard—look for it.

NEW NAVY WINDLASS

For anchors up to 150 lbs. Has Winch Head for rope; wild-cat for chain cable. You can heave on a line—let the chain run free—or stop it instantly at any point. Three operations controlled by one Heaving Lever. No complicated parts.

"It Pays to Buy Our Kind"

World's Largest Marine Hardware Manufacturers

Est. 1847

SEND NOW FOR THIS USEFUL BOOK

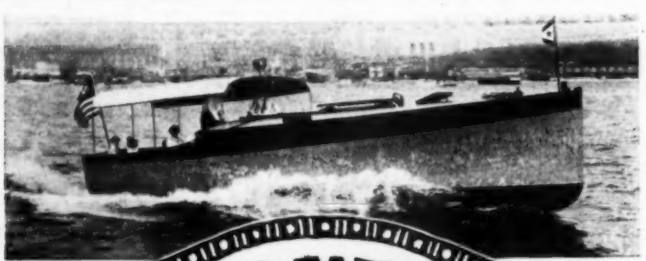
"Sea Craft Suggestions and Supplies" — 216 pages. Full of useful ideas. Tells how to box the compass—what is proper Ground Tackle; gives hints on Steering Gear, Stern Bearings, etc. Well worth having. Sent for 25 cents.

Mfrs. of the Famous Maxim Motor Boat Silencer

WILCOX, CRITTENDEN & COMPANY, INC.

Trade Mark Reg.

4 S. Main Street, Middletown, Conn.



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Wisconsin Motors are known for their ability to get maximum power out of every gallon of gasoline. Quiet, smooth running, light and compact, they are the product of the highest type of engineering skill.

Wisconsin Motors

CONSISTENT

for marine use contain those same qualities that have made Wisconsin Racing Motors champions of the world on road and speedway. If it's a Wisconsin it's a consistently dependable motor.

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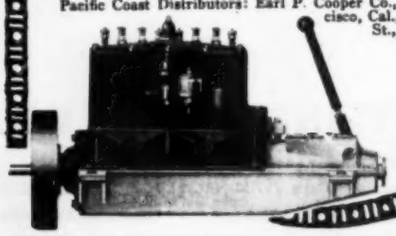

Four, six and eight cylinder types Write for specifications.

Something to Think About!

MATERIALS of all kinds are very difficult to obtain nowadays, and buyers are busily searching out additional sources of supply in order to continue production without interruption.

No man can have too many strings to his bow; therefore we feel sure that in our organization buyers will find a valuable additional storehouse from which to draw their requirements.

In our Catalogs are listed complete lines of Equipment for every department of the ship and yacht building trades. We stock everything needed from the laying of the keel until the craft takes the water. Copies will be mailed for the asking.

GEO·B·CARPENTER & CO

440 WELLS STREET - CHICAGO, ILL.

Contractors to U. S. Army and Navy

Use Gasoline or Kerosene in a

Miller

A Common-Sense Motor at a Common-Sense Price

The whole policy back of Miller Motors is explained by that one sentence, "A common-sense motor at a common-sense price." It means more than you realize at the first reading. Think it over.

Every boat owner wants a thoroughly good motor. But only one in a hundred wants the fancy features and frills that are making the best known motors almost prohibitive in price. Honest materials, honest workmanship, honest design—these are the essentials. But it is the luxuries—the unessentials—that are so costly.

For top-notch value at rock-bottom price, investigate Miller Motors. They are neither high priced motors nor cheap motors, but the happy medium that insures the greatest return for the money invested. Every essential for good service—economy, power and dependability—is built into them.

Miller Motors have been manufactured for almost 15 years. There are hundreds in use. They have reached to every part of the world. They are giving satisfactory service in all sizes and types of boats, in both pleasure and commercial use.

You don't take any chance when you buy a Miller Motor. The efficiency of every model we build has been proved in actual service.

There are fourteen Miller models, medium and heavy duty types, from 4 to 65 H. P. They are all four-cycle engines of approved design and will give the most economical service you can buy, considering first cost, fuel consumption and maintenance expense.

Write today for latest catalog and prices

Miller Engine Company

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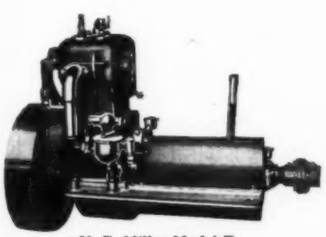
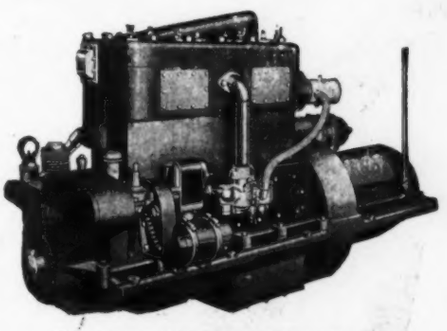
Menge Marine Hardware & Supply Co., 218-232 Canal St., New Orleans, La.

Pacific Marine Engine Co., 78 Marion Street, Seattle, Wash.



4 H. P. Miller Model F



40-50 H. P. 4-Cylinder Miller Model S

R. M. Hvid Company

LICENSER OF THE HVID OIL ENGINES

First National Bank Building, :: Chicago, Ill.

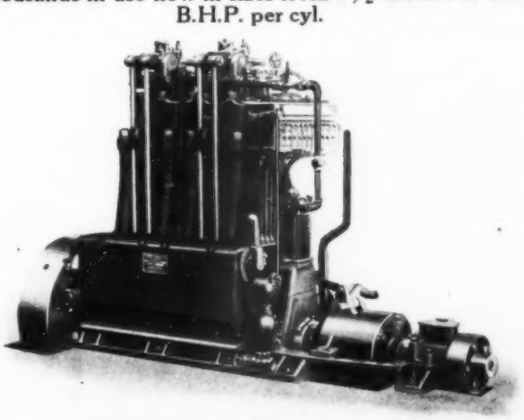
We solicit correspondence regarding license to manufacture engines under patents owned by us.

"HVID ENGINES RUN ON ANY OIL WHICH FLOWS FREELY"

Highest fuel economy. Extreme simplicity.
Absolute reliability in operation.
No preheating or starting on gasoline at any time.
No ignition devices of any kind. No carburetors.

The simplest and most reliable engine built.

Thousands in use now in sizes from 1½ B.H.P. to 100 B.H.P. per cyl.



View showing a 2-cylinder, 20 B.H.P. Hvid Oil Engine as built by the Burnoil Engine Company, South Bend, Ind.

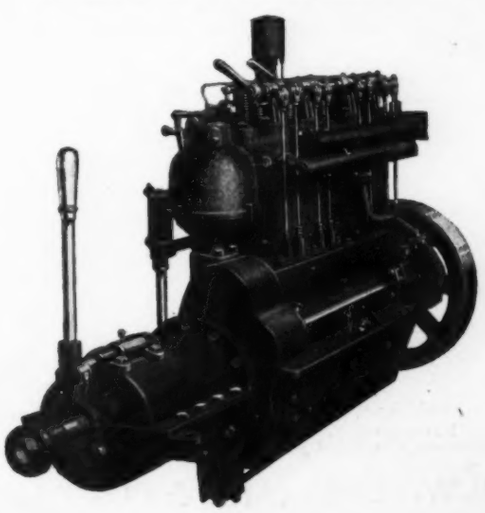
R. M. Hvid Co., First Nat'l Bank Bldg., Chicago, Ill.

Quayle OIL MOTORS Pay for Themselves In a Year

Use the cheapest oils.
Start and operate on any oil that flows freely.
No carburetors, batteries, magnetos or ignition devices of any kind.
A real oil engine—not a "made over" gasoline engine.

QUAYLE MOTORS COMPANY

38 South Dearborn St., Chicago U.S.A.



Packard CABLE

for

Perfect Ignition

Water, oil, heat and grease are continually striving to cause leakage in the cable.

Leakage of the life-giving current means a dead starting-motor, a dead engine,—one or both of them.

Packard Cables render such troubles practically impossible.

They're proof against water, oil, heat and vibration, and guaranteed by the makers.

Lighting Cables too.

Re-wire your car with Packard Cable now and prevent future wiring troubles.

Write Dept. M. B. for Bulletin and samples.

The Packard Electric Company Warren, Ohio

1918 FOURTEENTH ANNUAL

Grand Central Palace, New York

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Closes Saturday, January 26th

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The World's Greatest Display of
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IRA HAND, SECRETARY, 29 WEST 39th ST., N. Y. C.

JEFFERY'S MARINE GLUE

In some places economy is all right, but when you come to Marine Glue the difference in cost between the ordinary and the best is so little that you can't afford to take the risk of having to do the job over again for the sake of saving a little on the material.

It pays to use Jeffery's in the first place, every time. Jeffery's is universally conceded to be the best and most reliable marine glue. Jeffery's Glues are specified by the best designers and used by the best builders. A little investigation will show you why.

No. 1—Extra Quality for Deck and Hull Seams of Yachts and Motor Boats. Black, white, yellow or mahogany color. Give black the preference; it is more elastic and satisfactory in every way.

No. 7—Soft Quality for Waterproofing Canvas, for Covering Decks, Tops of Cabins, Canvas Boats, Canoes and Flying Boats. Black, white or yellow. With a coat of paint once a year it will last as long as the boat.

Waterproof Liquid Glue is used for the same purposes as No. 7, Soft Quality. Ready for use and requires no heating; simply open the can and paint it on. Especially recommended in combination with linen between the diagonal planking of flying boats. Will also attach canvas, cork, felt, rubber, leather, and linoleum to iron, steel, or wood.

Special Marine Canoe Glue. Best Filler for Canvas. Black, White and Yellow. Every canoeist should carry one of our 25c emergency cans. Sent by mail on receipt of 32 cents in stamps. Canada 37 cents.

FOR SHIP'S DECK USE No. 2 First Quality Ship Glue, or No. 3 Special Navy Glue.
Put up in 1, 2, 3 and 5 lb. cans; also 14, 28, 56, 112 lb. boxes.

Sold by all Yacht, Boat and Canoe Supply Houses, Shipchandlery, Hardware, Paint, Oil and Sporting Goods Dealers.

Write to-day for new booklet "Marine Glue What to Use and How to Use It." It contains a fund of valuable information that every practical boat owner and builder should know.

L. W. FERDINAND & COMPANY, 152 Kneeland Street, Boston, Mass., U.S.A.

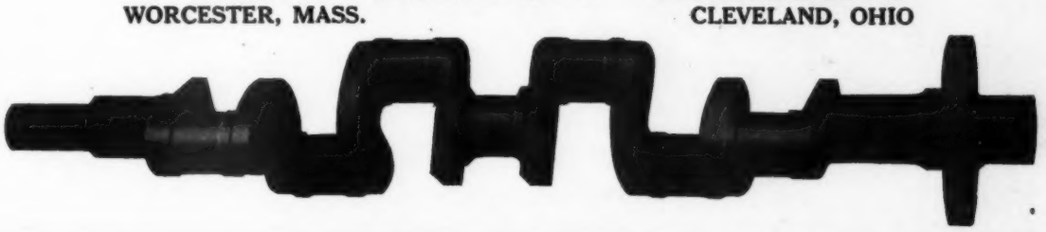
WYMAN-GORDON
GUARANTEED FORGINGS

Engine Builders:

Quality counts. But there is something beside quality that has kept our two great plants filled with the work of the leading manufacturers of marine, automobile and aeroplane engines. There's something more.

Wyman-Gordon service facilitates production, relieves your organization and helps you to meet your own schedules. In many cases it also reduces manufacturing costs.

WYMAN-GORDON COMPANY
WORCESTER, MASS. **CLEVELAND, OHIO**



For Southern Service—
Speedway Express Cruisers Three models, 60, 52 and 40 feet are available for early delivery.

THE modern structural features, the practicability of arrangement, the manifest individuality of appointments, the mechanically perfect motive power, constitute unity, consequent efficiency and satisfaction—

Speedway

Express Cruisers *of* Standardized Design

Three models 60—52—40 feet
Literature upon request

Gas Engine & Power Company and Charles L. Seabury & Company, *Consolidated*

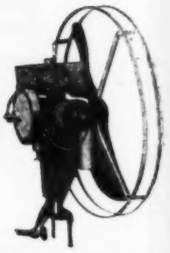
MORRIS HEIGHTS. DEPT. D. NEW YORK CITY

Some Real Sport for You This Winter

Here's the greatest Winter Sport you ever saw—a combination of the best features of motoring, motor boating, aeroplaning and ice yachting. And in spite of its hybrid character it is a thoroughbred which appeals to every sportsman who has red blood in his veins.

Speed, safety, comfort and thorough good fun are the winning qualities of the

AERO-SLED KING OF WINTER SPORTS
SPEEDS UP TO 50 MILES PER HOUR



The Aero-Sled is steered and controlled like an automobile. It has cushioned seats, auto steering wheel, hand brake and steel shod runners. In its design we have paid special attention to safety and comfort at high speeds. You can glide smoothly along at a rate of ten miles an hour and on smooth ice you can travel 50 miles an hour if you wish.

Can you imagine a more exhilarating sport?

This is the powerful little motor used on the Aero-Sled. It is the regular Aerothrust Outboard Marine Motor, one of the most popular rowboat motors on the market. It is a smooth, efficient, vibrationless engine, developing 3 H.P. and designed to operate at any speed from 250 to 1800 R.P.M.

Aerothrust

Two cylinder opposed, air cooled, with built-in-flywheel magneto. Fitted with 32 in. aero propeller. You can use the same engine on your rowboat in summer.

We also build a 5 H.P. Aerothrust motor.

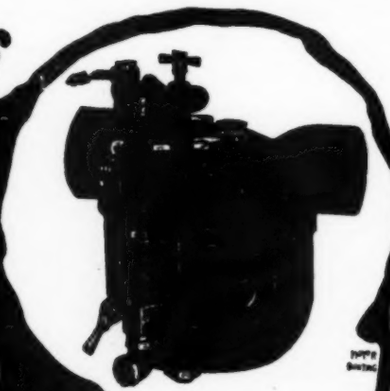
Write today for full details and prices on the Aero-Sled and Aerothrust Motors. We can make immediate delivery on early orders.

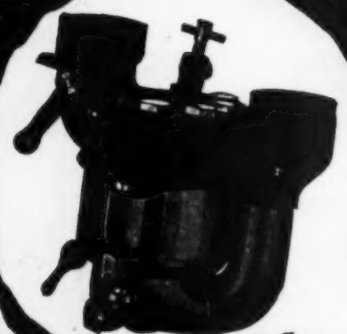
AEROTHRUST ENGINE CO.

50 Madison Street - - - - La Porte, Ind.

King of Marine Carburetors

KINGSTON
THE WORLD'S MOST POPULAR CARBURETOR





The Kingston is today the world's most popular carburetor.

So far as we know we are now producing more carburetors than any other manufacturer in this line, and this is not the time of year for our maximum production.

The demand is keeping our plant busy night and day,—and we are the largest carburetor manufacturers in the world.

There is a real reason for Kingston popularity. It is the all-around efficiency of the Kingston Carburetor.

Used on automobiles, marine engines, tractors, motor cycles and for general gas engine work.

Byrne-Kingston & Co., Kokomo, Indiana, U. S. A.

New York: 1733 Broadway
Chicago, Ill.: 1430 Michigan Ave.
Detroit, Mich.: 870 Woodward Ave.
Boston, Mass.: 111 Haverhill St.
Los Angeles, Cal.: 334 W. Pico St.

Because of the fine record on the construction of its quota of 110-foot submarine chasers, the Matthews Boat Co. has been especially complimented by the United States Navy Department. The boats were splendid examples of hull building, and what is more important to the Government and the nation, THEY WERE DELIVERED ON TIME.

To complete in record time, a contract taxing the entire capacity of the plant, is the acid test of a business organization. But speed and efficiency are built into the Matthews business, just as much as the far-famed quality of Matthews Craft.

The Matthews Boat Co. has the facilities and equipment to build a limited number of hulls for commercial service quickly and economically. Tugs; Barges for canal, lake and coast-wise trade up to 200 feet; Auxiliaries; Ferries; Fishing boats.

MATTHEWS CRAFT
"QUALITY WITHOUT EXTRAVAGANCE"

While our limited building space lasts, we will serve you courteously, efficiently, and without excess profit just as we have served all Matthews customers for many years back.

THE MATTHEWS BOAT COMPANY
MARINE RAILWAYS, STORAGE BASIN AND WORKS
PORT CLINTON - - - - OHIO

Red Wing Thorobred

THE MOTOR WITH POWER TO SPARE

CUTTING DOWN COSTS

Unit Power Plant Model "F" THOROBRED
28-36 H. P., 4 1/16 x 5"
Furnished with or without Unit Power Plant

Those who use a marine motor for commercial purposes are interested chiefly in three things: dependability of service, economy of operation and upkeep, and price.

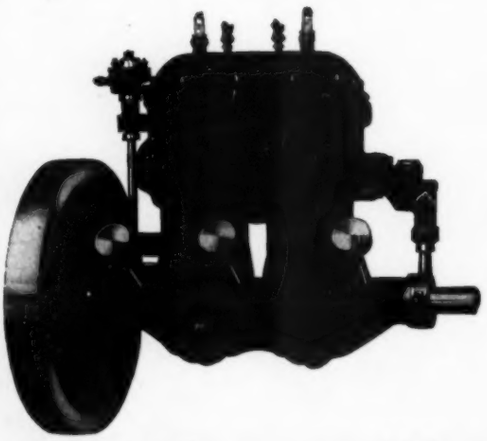
In all of these the Red Wing Thorobred excels. Designed and built as near perfection as science, selected materials and ideal manufacturing methods will allow, the Thorobred spends no time in the repair shop; it is on the work all the time. This same perfection of design and workmanship insure an economical engine on fuel. The cost of the Thorobred is surprisingly low, due to modern, cost-reducing methods of quantity manufacture.

When you've put a Thorobred in your boat you've made a sound investment.

Built in sizes from 14 to 40 H. P.
4-cyl. 4-cyc. Gasolene or Kerosene.

RED WING MOTOR COMPANY, Dept. B, Red Wing, Minn., U. S. A.

EAGLE ENGINES



Eagle Marine Engines

This company has specialized for 18 years on two cycle Marine Engines for pleasure and working boats. The product during these years has progressed with the demands and today Eagle Engines are as near perfection as experience and modern manufacturing equipment can make them.

Our line covers every requirement for Boats up to 25 feet in length of the pleasure and working models, and in our offering you can find an engine that will meet your exact requirements.

As "Eagle" Engines are sold through established dealers throughout the world, the service possible under these conditions is of considerable importance to the user. It's not too early to arrange for 1918 agencies at this time. We are always pleased to give applications our prompt consideration.

CATALOG FREE UPON REQUEST

THE TORRINGTON COMPANY

STANDARD PLANT : TORRINGTON, CONN.

WINTON MARINE ENGINES

We have two W-5 - 125 H. P Engines coming through for delivery in January.

Winton Engine Works

CLEVELAND, OHIO

A Standardized Twenty-Five Foot Runabout

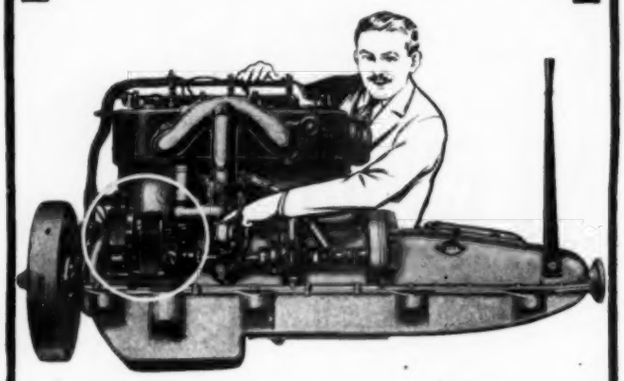
A GUARANTEED 20-mile boat that seats six people comfortably. That is designed by America's best known Naval Architect—John L. Hacker. Furthermore, is built under John L. Hacker's personal supervision. A fast, dry, safe, seaworthy and dependable boat. A standardized boat, completely equipt, built of finest obtainable materials, fitted with all necessary requirements for comfort and safety.

Powered with a four cylinder Scripps all-enclosed motor with complete electric starting and lighting system. 30-35 H. P. Bosch Magneto. Schebler carburetor. Willard storage battery. Boat controls and operates on same principle as an automobile, and as easily. Seats luxuriously upholstered. Ten more of these 25-footers can be delivered in time for the Florida season.

All orders will be filled strictly on priority of receipt.
Write today for descriptive booklet and full specifications.

JOHN L. HACKER BOAT COMPANY, 323 Crane Avenue, Detroit, Mich.

Net Price
$2000.00
Completely Equipt
F. O. B. Detroit, Michigan



"Worth more?-yes and it saves more, too"

BerlingMagneto

Worth more Does more

During 1917 the Berling has risen!

When the New York Automobile Show ushers in 1918, it will see the Berling Magneto enthroned on the finest cars at the Exposition.

If you visit the New York Show you'll be interested in the Berling Magneto Exhibit at the New Chatham, Vanderbilt Avenue, 48th and 49th Streets.

Up until 1917 the Berling was known as the magneto used by the best motorcycles, aeroplanes and motor-boats.

This year the nation's finest trucks and pleasure-cars have adopted the Berling after many, many months of thorough test.

That is why it has been necessary to double the Berling's productive facilities during the past few months.

ERICSSON MANUFACTURING CO.

1105-1145 Military Road
BUFFALO, N. Y.

The Diesel Engine and Motor Ship

(*Continued from December issue*)

The limited number of American firms that are engaging in building oil-engines for motor ships at present are almost overwhelmed with work. For instance, the McIntosh & Seymour Corporation, of Auburn, N. Y., have under construction twenty-two standardized marine Diesel engines, each of 500 b.h.p., representing an investment of about one and a quarter million dollars from domestic ship owners, such as Clinchfield Navigation Company, the Texas Company and the Aluminum Company of America.

The Skandia-Pacific Oil Engine Company, of San Francisco, have under construction about thirty surface-ignition oil-engines of 240 h.p. and 360 b.h.p., and recently they purchased a Werkspoor-Diesel engine license and are erecting new shops for the building of marine engines of 500 to 2,000 h.p. The James Craig Engine Machine Works, of Jersey City, N. J., has their plant full with moderate and high-speed four-cycle type Diesel engines, but control of this plant now is in the hands of the Navy *pro tem*. The Southwark Foundry & Machine Co., of Philadelphia, Pa., are now finishing off the last batch of a large number of marine two-cycle Diesel-type motors. Some time ago they received so many orders that they were obliged to sub-contract many of them to the Lyons-Atlas Co.

The Wm. Cramp Ship & Engine Building Co., of Philadelphia, Pa., some time ago acquired a Burmeister & Wain Diesel license, but owing to the urgency of naval work they have been obliged to temporarily suspend all Diesel work, and the same applies to the New York Shipbuilding Corporation of Camden, N. J., and the Newport News Shipbuilding & Dry Dock Co., both of whom purchased a Werkspoor-Diesel license.

The Winton Engine Works, of Cleveland, Ohio, builders of the well-known gasoline engine of that name, which has been installed in so many yachts, have made remarkably rapid strides with their own Diesel engine as they already have 25,000 b.h.p. on order, which represents a sales value of between two and one-half and three million dollars. Seeing that as both they and the McIntosh & Seymour Corporation have only recently entered the marine Diesel engine business, the value of their joint sales in this brief period form a striking example of what we can expect in the way of a huge domestic marine oil-engine trade in the near future; if, of course, it is not thrown into confusion by Government action through war exigencies.

At the Busch-Sulzer Diesel Engine Works at St. Louis, Mo., we can anticipate some great developments in the near future. At present they have mostly stationary type Diesel engines under construction, also a number of submarine engines. The New London Ship & Engine Co., of Groton, Conn., have been working night and day for four years without a break building submarine Diesel engines, and have dozens of such motors under construction at the present time. Some little time ago this firm abandoned the German two-cycle design and produced a four-cycle engine of their own design, which has proved far more satisfactory. This gives the direct answer to such statements as have appeared to the effect that Americans cannot build marine Diesel engines. There also are many other domestic companies building crude-oil engines of the surface-ignition and true Diesel types, although not on quite such a large scale as the firms just quoted.

Exactly as to what is building abroad in the way of motorships is hard to say, although it is known for certain that Italy, Russia, Great Britain, Holland, Denmark, Norway, Sweden and France all have a number of big sea-going vessels under construction. Three of Italy's greatest shipbuilding and engineering companies recently have taken up the construction of commercial motor ships, namely, Ansaldo & Co., the Fiat-San-Giorgio, and Franco Tosi. The Fiat-San-Giorgio have laid down a new yard for this purpose which has a capacity for eight Diesel steel-built ships of 8,000 tons D.W.C. at one time. These vessels have been standardized so that the builders are offering delivery of these motor vessels for the second half of next year (1918)—a position no other shipyard in the world is in to-day. Yet, little Italy is in the midst of fighting for her life; but she considers it vitally important that motorships should be developed and produced regardless of that. The same company also have laid down ships for building standardized wooden auxiliaries of 2,500 tons D.W.C., in which they are installing two Diesel engines of 4,000 h.p. per boat. Delivery of these are offered for the first half of 1918.

Harland & Wolff, of Belfast, have on order for the Elder-Dempster Line and for the Glenn Line, eight fast motorships of about 13,000 tons D. W. C. They will be Diesel powered. The East Asiatic Co. have twenty-two big Diesel motorships on order. The Fred Olsen Co., of Christiania, has six large Diesel-driven freighters of about 8,000 tons D. W. C. each under construction; three will have Werkspoor engines and the other three will be Burmeister & Wain engined.

Several months ago I stated in a contemporary that the Burmeister & Wain Co., of Copenhagen, Denmark, were full up with orders for six years ahead. The company wrote to correct this, as I had made a mistake, and that the truth is—their entire capacity is booked for *eight* years ahead with orders for motorships. This shows that the shipowners who are responsible for placing these orders have sufficient confidence in the future of the marine oil-engine to believe that no matter the cost of construction seven or eight years hence, it will pay them to operate motorships. Werkspoor of Amsterdam are also overflowing with orders for years ahead, but, in many cases their output of Diesel motorships is interfered with by the scarcity of materials in Holland, which is totally dependent upon outside sources.

We now can discuss the question of developments of design. Very little headway has been made during the last few years so far as greater power is concerned, referring, of course, to the mercantile type of Diesel engine; and the U. S. S. "Maumee" is still the highest powered motor-vessel afloat.

Instead, the great builders have preferred to improve minor features of design until they have produced a reliability under all severe conditions of merchant marine service equal to and better than that of steam. When normal conditions once more reign no doubt we shall then turn to the development of high powers. One Swiss company has a six-cylinder Diesel engine of 4,000 b.h.p. running twelve hours every day in the year at a dry-dock in Harland & Wolff's great Belfast shipyard. This means 666 b.h.p. per cylinder, which is no mean achievement. When the time comes they will not have much difficulty in producing a marine motor of this power. That is to say, 12,000 b.h.p. (15,000 i.h.p.), for a triple-screw ship. I refer to Sulzer Bros.

Yard and Shop

(*Continued from page* 38)

A Lawley-Sterling 48-Footer

A subject of great discussion during the last two years refers to the construction of all craft so that they may be adaptable to war service and Satie A, a Lawley-Sterling production may be said to efficiently fill the bill. This 48-foot, 6-inch cruiser, with high sides, extremely well built, and having a beam of 10 feet, and a draft of 3 feet, is remarkably seaworthy. She was designed by Fred D. Lawley, and built by the Geo. Lawley & Son, Corp., of Neponset, Mass., for Edward C. Crossett, who summers at Wianno, Mass. Twin Model F, six-cylinder 145 h.p. Sterling motors turn Columbian architect propellers having a diameter of 23 inches by a pitch of 23 inches at 1,100 r.p.m., from which a constant cruising speed of 22 m.p.h. is maintained.

Satie A is a diversion in that she is of the round-bilge type. There is a wide flare at the bow and the lines are fast. The most impressive thing about this boat is that she is but 48 feet, 6 inches, but appears to be considerably larger and even is so arranged that one gathers the same impression when viewing the interior. The many good points about the craft are visible at a glance and need no further dilatation here.

Correction

On page 91 in an advertisement in the December issue, it was stated that the Dachel-Carter Boat Co., of Benton Harbor, Mich., have a plant 200 by 72 feet and are equipped to build boats up to 65 feet in length.

As a matter of fact, this plant occupies several acres fronting on the ship canal between Benton Harbor and St. Joseph and has facilities for building wooden vessels up to 200 feet in length and is one of the largest and best equipped on the Great Lakes. Both cities have been centers of the boat-building industry in the past making it possible to employ only skilled boat builders at this plant.

This company has had twenty-five years' experience in designing and building all sizes and types of pleasure and commercial boats and will gladly furnish sketches and specifications to those interested and in the market for new boats.

The Dachel-Carter Boat Co. is specializing in runabouts, express cruisers and pleasure or commercial craft of 65 feet in length and over, and are equipped to turn out work of the highest class.

Compliment to Gray Engines from an Unusual Source

The Gray Motor Co., of Detroit, Mich., is in receipt of a letter from Colin Douglas, 357 Fourth Ave., New York City, stating that he has just recovered his Gray Model F engine No. 25208 which was stolen last summer and that the thieves had been captured and confessed.

After a cross-examination it was learned that they made a careful inspection of several different cruisers before selecting the Gray engine, which they took out of his cruiser. He says the men were first class mechanics and he considered their choice a compliment to the Gray manufacturers.

"Never Falls to Grip"

"THE GEAR THAT HANGS ON"

BULL-DOG
REVERSE GEAR

The first and most important qualification of a reverse gear is to hang on to its load, to hang on like grim death, in order that the power of the motor may be transmitted to the propeller without losing an ounce of energy.

The Bull-Dog Reverse Gear is well named. It hangs on like a bull dog and gives you all the advantages of a reliable reverse, a free engine clutch and a forward drive that is as positive and dependable as a solid shaft and coupling.

The Bull-Dog is smaller for its capacity, more compact, simpler, lighter and more accessible than any other reverse gear. It is completely enclosed and oil-tight, takes little room in the boat, and operates quietly without heating up.

Satisfaction Guaranteed or Money Refunded

Adopted for standard equipment by several prominent marine engine builders. Try one in your boat with your old engine. We guarantee you absolute satisfaction—can you ask more?

Four Sizes. Iron or Aluminum Case.
1 to 64 H.P. per 100 R.P.M.

Write today for catalog and prices.

Atlas Machine Works
Successors to Kennedy Machine Co.
797 St. Aubin Avenue
Detroit, Michigan

FORCE FEED OILERS

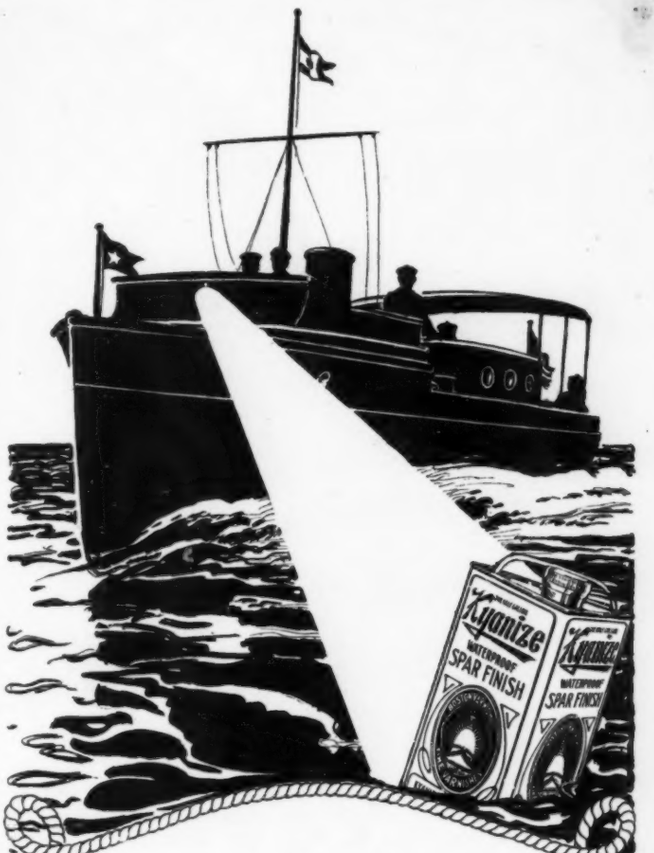
BUILT BY THE WORLD'S LARGEST MANUFACTURERS OF LUBRICATING DEVICES

Detroit Force Feed Oilers are made in many styles and sizes suitable for every kind of gas, gasoline or oil engine—tractor, truck, marine, stationary, automobile or aeronautic. There is nothing "hit or miss" about these efficient oilers. They are free from complicated mechanism and do not clog up and get out of order. They provide the only safe lubricating system for high grade engines—a positive, reliable force feed.

Every change of engine speed regulates oil feed automatically in exact accordance with need of engine. Positive force feed drives the oil to all frictional surfaces.

Write today for booklet "P."

DETROIT LUBRICATOR COMPANY
DETROIT, U. S. A.
MAKERS OF STEWART CARBURETORS



LOOK FOR

The Three-Cornered Can

OF

Kyanize
KY-AN-IZE

SPAR FINISH

This can with the buff label, bearing the "State House" Trade Mark of The Boston Varnish Co. is your guarantee of a perfect varnish for your boat.

Kyanize Spar Finish is a light color, free flowing, tough, all-weather varnish that will not soften, crack or peel in any climate and can be submerged indefinitely in salt or fresh water without *ever turning white.*

Motor-boat owners from coast to coast are finding that it pays to

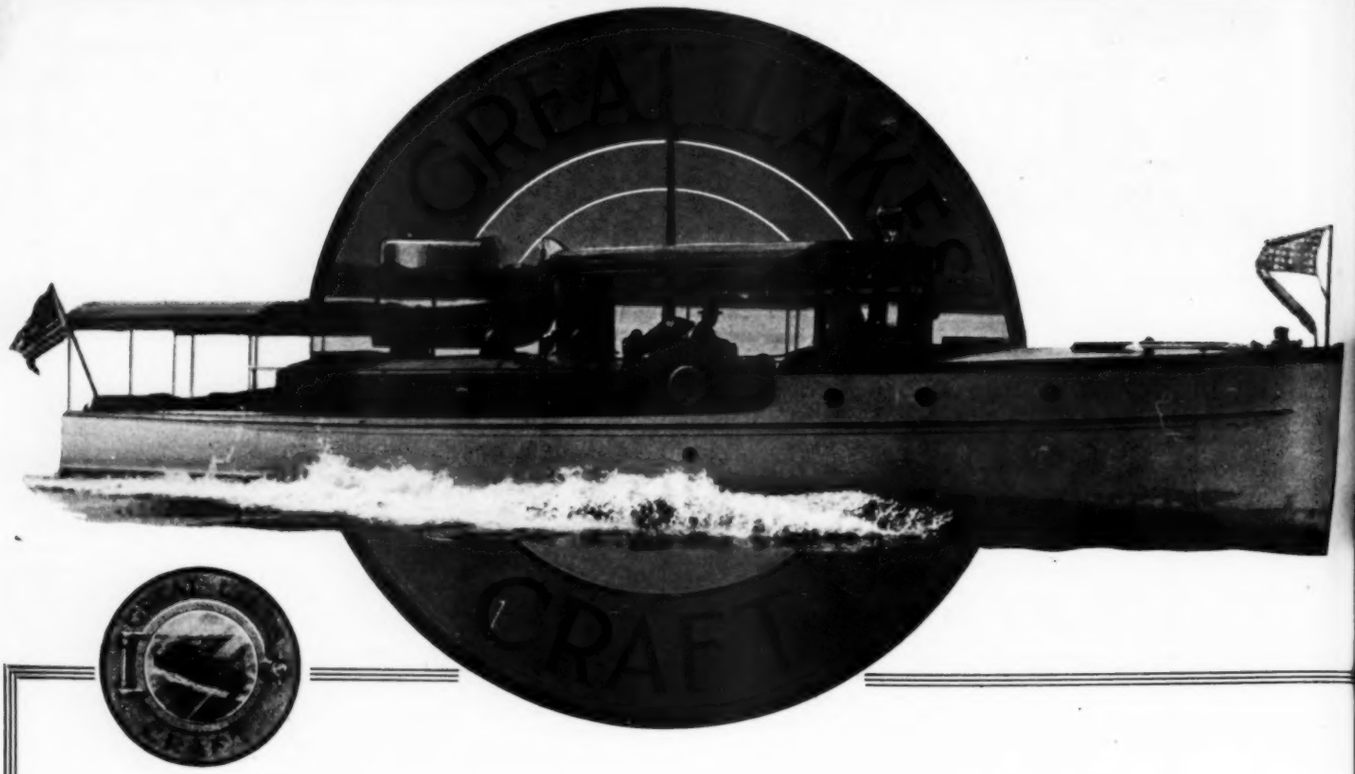
Economize with Kyanize

Boston Varnish Company
KY-AN-IZE

Everett Station, Boston

Chicago
519 W. 12th St.

San Francisco
311 California St.



Very Successful

IN addition to building Standardized Forty and Fifty Foot Military Type Express Cruisers, the Great Lakes Boat Building Corporation have a special department for designing and building specially designed boats.

Some of the most spectacular and successful of the 1917 boats have come out of our yards at Milwaukee. The same efficient attention to detail, the same definite intention to produce nothing but the best, the same rigidity of construction characteristic of the Standardized Military Type Express Cruisers, is equally characteristic of the built-to-order boats we build.

A designing department, with a wonderful wealth of experience at their disposal enables us to submit to you various designs which are out of the ordinary, distinctive and highly practical.

A factory and factory equipment, operated by an organization running at top notch efficiency and with a full knowledge of how good boats ought to be built, backs up the designing department.

By placing your order with this organization you know definitely that your boat will be properly designed, efficiently built and completely equipt, you know definitely it will come up to your expectations.

It will be a pleasure to have you ask us questions about boats we have built and to have you tell us a few things about the boat you would like to have us build for you.

GREAT LAKES BOAT

Designers and Builders of Boats

MILWAUKEE

Express Cruisers

THE two boats illustrated on these pages are typical examples of the built-to-order boats designed and built by the Great Lakes Boat Building Corporation. Both boats are exceptional for their speed and general all around efficiency. Both owners are enthusiastic boosters for Great Lakes Craft.

The boat to the left is "Kingfisher" owned by Mr. E. L. King, Winona, Minn. and Daytona, Fla. A 56 Foot Express Cruiser powered with a pair of six cylinder Van Blercks, which has a cruising speed of 24 miles an hour. Now in service at Daytona, Fla. A very successful boat.

The boat at the top of this page is "Kumagin" the fastest "big" Express Cruiser of the year. "Kumagin" is a 76 Foot Express Cruiser designed and built by the Great Lakes Boat Building Corporation for Mr. Albert Pack of Chicago. Powered with a pair of eight cylinder Van Blerck engines. Speed 23 *miles an hour*. One of the most remarkable speed records ever obtained. This is a great, big, heavily constructed boat, fully equipt and luxuriously furnished, yet is able to maintain a 23 miles an hour gait, hour after hour. "Kumagin" is the biggest V-Bottom type of Express Cruiser to be launched to date, as well as being the fastest for her size and power.

Additional details on these two boats, full details and booklets on the Forty and Fifty Foot Military Type Express Cruisers, in fact, all information at our disposal pertaining to boats, is here if you will ask for it.

BUILDING CORPORATION

Of Distinction and Quality

WISCONSIN

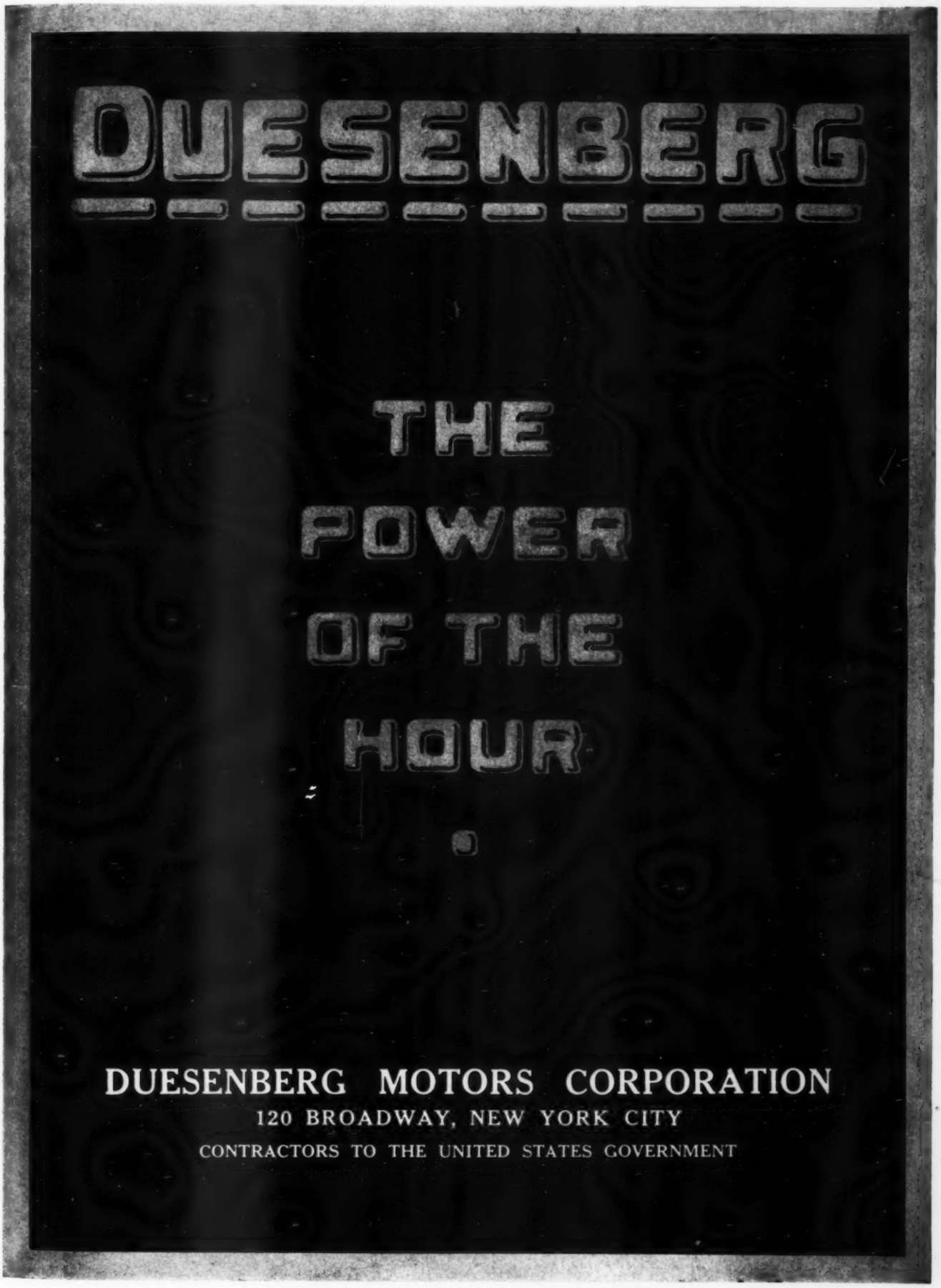
Making it Easy for the Cruising Motor

YOU who have cruised in Florida waters appreciate our service at various harbors along the coast.

You who are making cruises for the first time should get our list of service stations, where you may procure THAT GOOD GULF GASOLINE and SUPREME AUTO OIL.

We are also issuing booklet of harbor information, showing rise of tide, depth of water, and other information serviceable to coastwise travelers. We will be pleased to send the booklet on request.

Gulf Refining Company,
Department 2000 Pittsburgh, Pa.


DUESENBERG
THE
POWER
OF THE
HOUR
DUESENBERG MOTORS CORPORATION
120 BROADWAY, NEW YORK CITY
CONTRACTORS TO THE UNITED STATES GOVERNMENT

"Inquirer," Colonel James Elverson's Duesenberg Equipt
Express Cruiser

Duesenberg Marine Engines—the utmost attainable in high speed, high powered, efficient marine engines.

Six Cylinder 6¾ x 7¾ in.
Rated 200-260 H.P. $5,500.00

Eight Cylinder 6¾ x 7¾ in.
Rated 280-360 H.P. $7,000.00

The most spectacular and successful boats of 1917 season are powered with Duesenberg Marine Engines

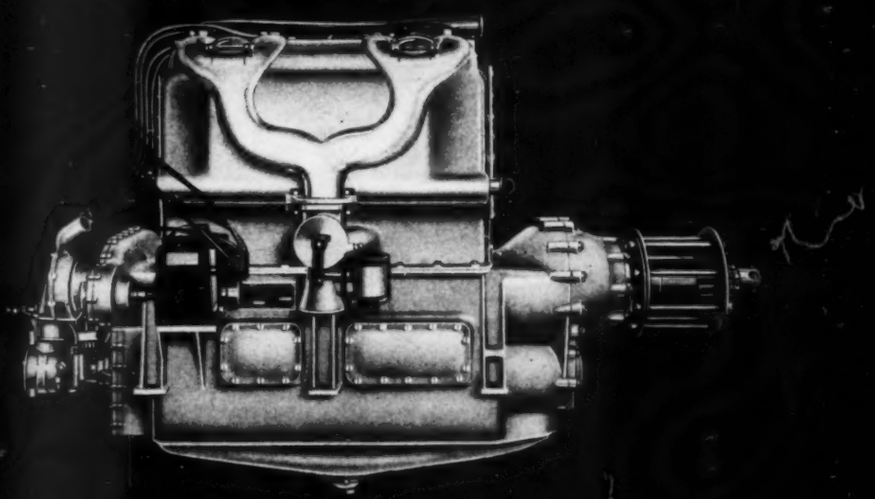
Six Cylinder Patrol Model Duesenberg Marine Engine

Duesenberg Motors Corporation, 120 Broadway, New York City
Contractors to the United States Government

Primary Training Airplane
Ordnance Engineering Design—Duesenberg Equipt

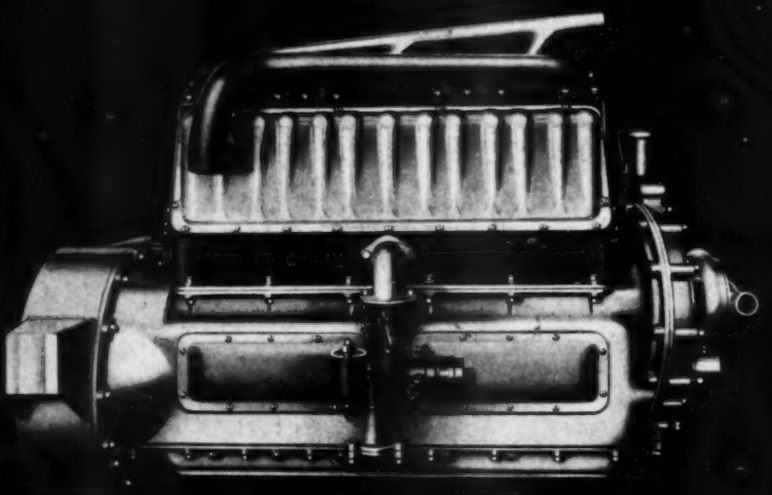
Duesenberg Airplane Engines—Simple, Powerful, Efficient. The Duesenberg Design, in which is incorporated the famous Duesenberg Valve Action, adapted to Airplane Service.

The same characteristics of tremendous power, absolute dependability and ease of operation which characterize the Duesenberg Marine and Automobile Engines are also found to a marked degree in the Duesenberg Airplane Engine.



Four Cylinder Duesenberg Airplane Engine

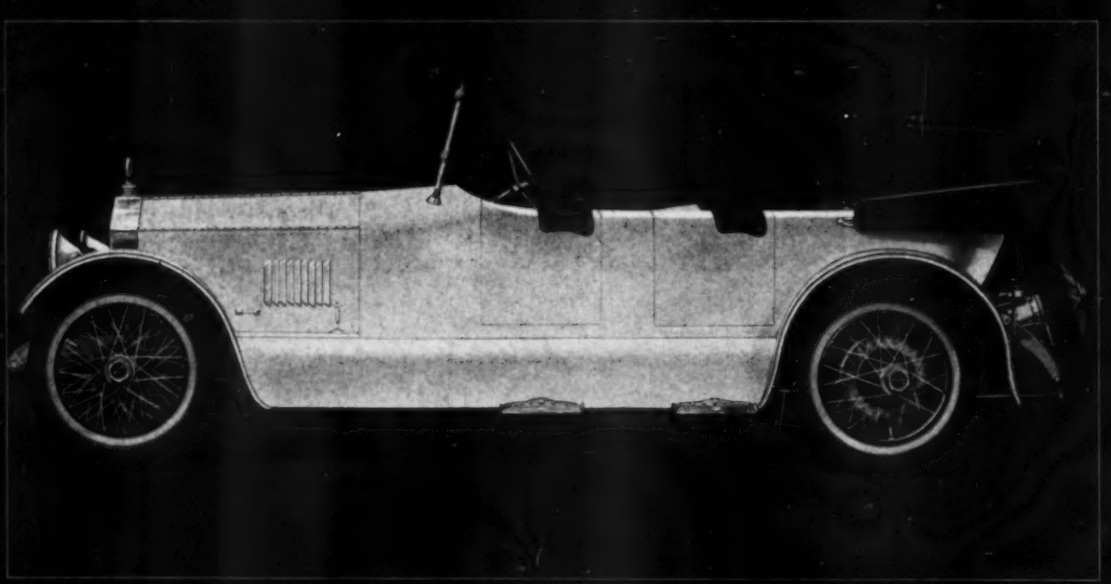
Duesenberg Motors Corporation, 120 Broadway, New York City
Contractors to the United States Government



Six Cylinder Duesenberg Automobile Engine

The Duesenberg Automobile Engine the engine of ultra-refinement. In the Automobile Field the Duesenberg Engine holds a dominant position simply through its sheer efficiency and tremendous power.

All Duesenberg Engines follow the same general design. It is the unique Duesenberg Valve Action that makes these motors different, that makes them more powerful, more flexible, more efficient.



A "Roamer" car Duesenberg Equipt

Duesenberg Motors Corporation, 120 Broadway, New York City

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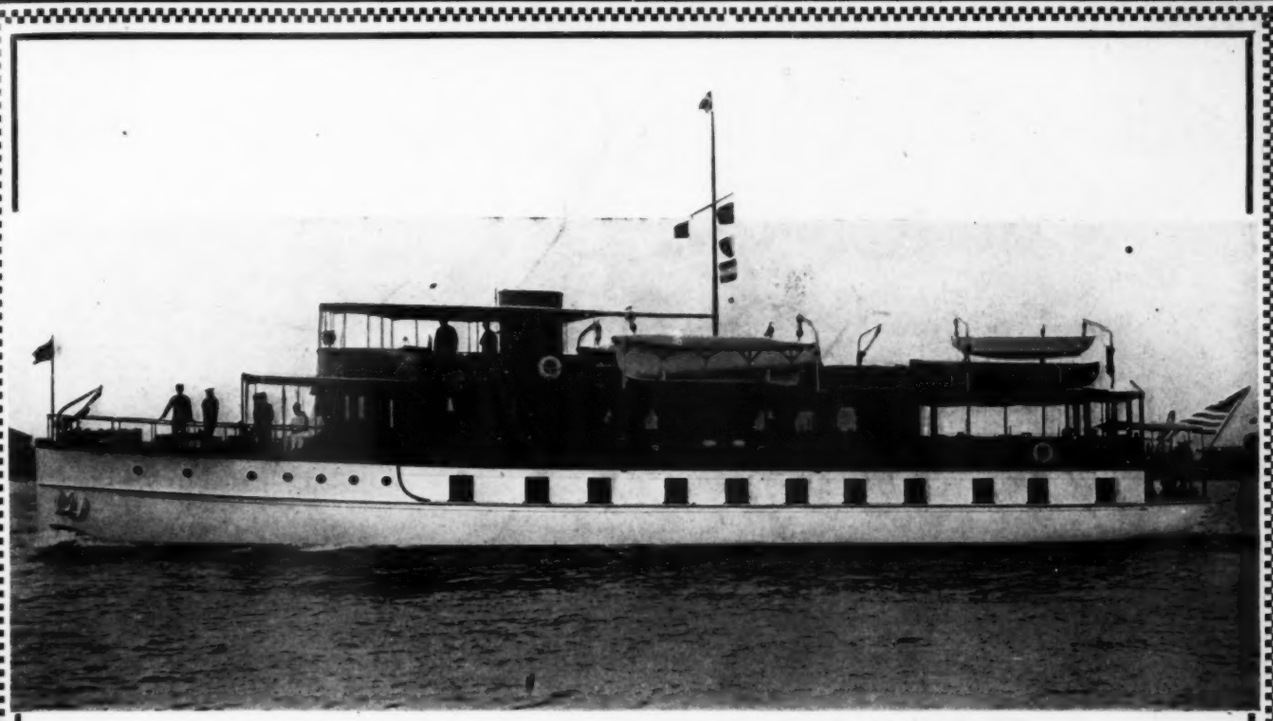

106-ft. Houseboat Leonie, designed and built by us for Mr. Murray Guggenheim, New York

THIS winter, while we are bending our utmost efforts to assist your Uncle Sam in "making the world safe for democracy," it will be no small satisfaction to us to realize that in Florida

Mathis-Built Houseboats

will be making enjoyable the leisure moments of many of America's busiest men.

Added to the large and growing family of Mathis-built houseboats which have been the feature of every Florida season since 1909—when we created the new-type Cocopomelo—will be the boats of men who know where and how to get the utmost in service and comfort. Men like

MURRAY GUGGENHEIM, NEW YORK, whose 106-ft. Mathis-built houseboat Leonie is shown above.

L. H. & A. W. ARMOUR, CHICAGO, whose 106-ft. Chieftain is in many respects similar to the Leonie.

JAS. DEERING, CHICAGO, whose 80-ft. houseboat Nepenthe, we designed and built.

A. P. ORDWAY, NEW YORK, whose 71-ft. houseboat Jane VI, we completed last winter.

H. N. BARUCH, NEW YORK, for whom we have built several houseboats.

The same service which we have given these men is yours, when you are ready to plan or build your houseboat, or cruiser.

MATHIS YACHT BUILDING CO.

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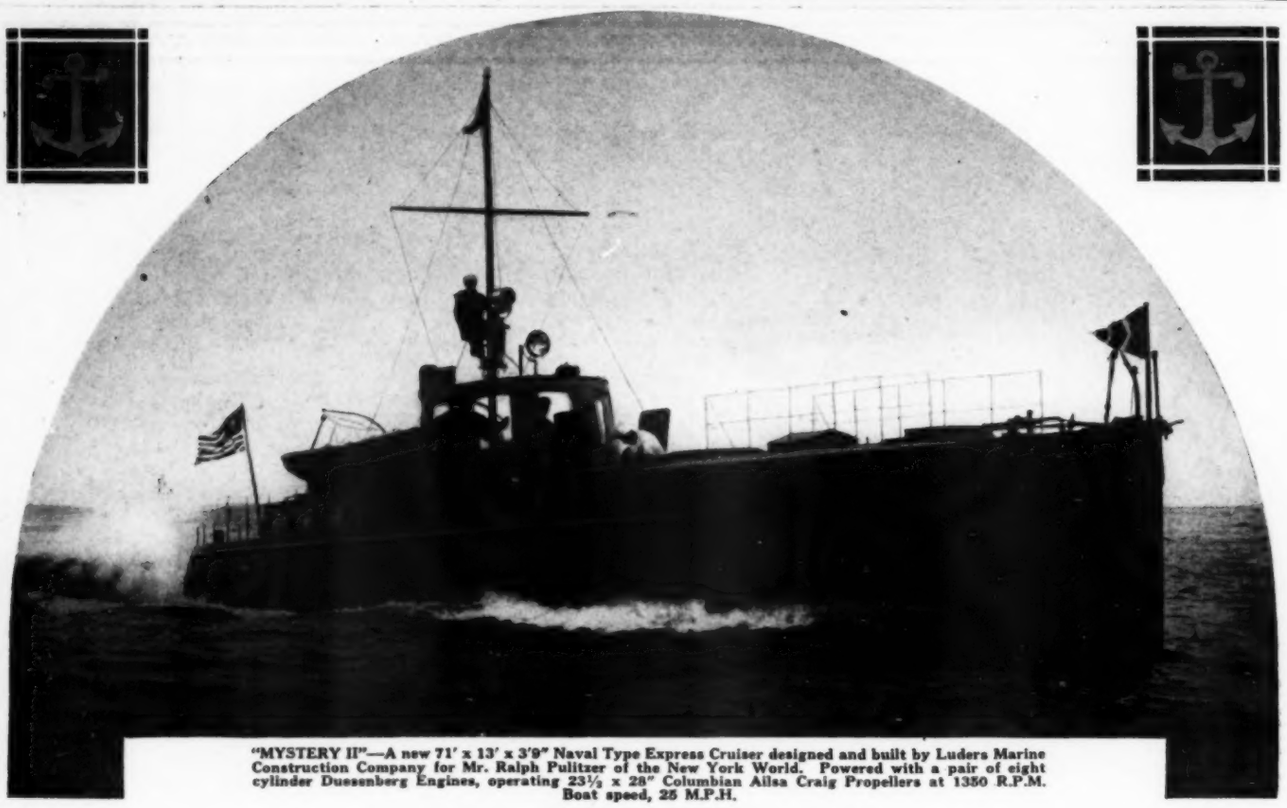

"MYSTERY II"—A new 71' x 13' x 3'9" Naval Type Express Cruiser designed and built by Luders Marine Construction Company for Mr. Ralph Pulitzer of the New York World. Powered with a pair of eight cylinder Duesenberg Engines, operating 23½ x 28" Columbian Ailsa Craig Propellers at 1350 R.P.M. Boat speed, 25 M.P.H.

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COLUMBIAN

Columbian Propellers fit every requirement of the power boat owner. On these two pages you will find illustrations of four distinctly different types of boat, yet the properly designed Columbian Propeller is used in each instance, despite the wide diversity of the speed and working requirements. No matter what your boat may be, there is a Columbian Propeller designed for it, a Columbian Propeller which will give you more speed and better efficiency.

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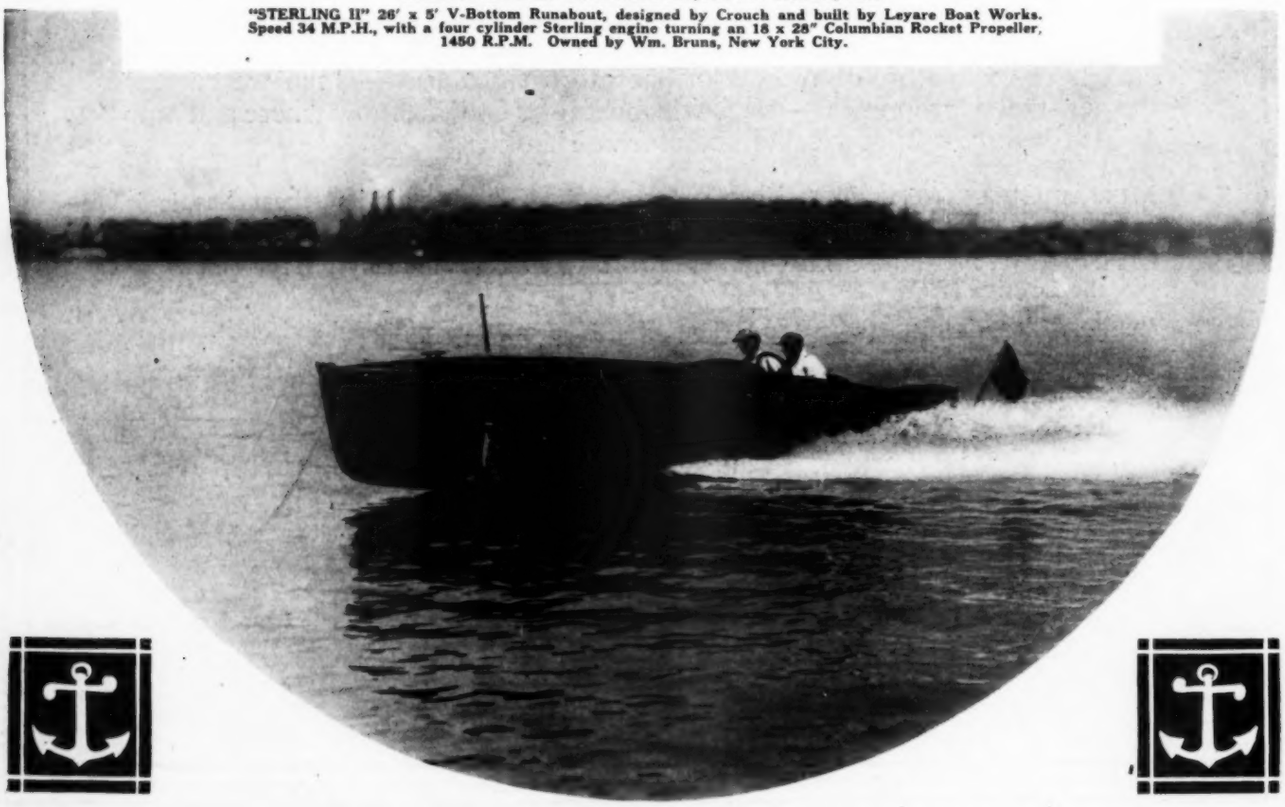
"STERLING II" 26' x 5' V-Bottom Runabout, designed by Crouch and built by Leyare Boat Works. Speed 34 M.P.H., with a four cylinder Sterling engine turning an 18 x 28" Columbian Rocket Propeller, 1450 R.P.M. Owned by Wm. Bruns, New York City.



Aux. Schooner "Virginia Pendleton" 270' O.A. Pair 160 H.P. Bolinder engines operating Columbian Propellers 67" diameter, three blade style "H". Also equipt with Columbian shafting 6 5-16" diameter, 28' long; Columbian Strut weighing over 1,000 lbs., and complete shaft log. Designed by F. S. Pendleton. Built of galvanized iron, steel keelsons, beams, etc.

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The Fastest Boat in the World uses a Columbian Propeller. "Whip-po-Will, Jr.," illustrated hereunder, averaged 69.39 M.P.H. in six one-mile runs on Lake George under official A. P. B. A. supervision and timing. One run was made at 70.15 M.P.H. Further evidence of the ability of our Designers to design propellers of the highest efficiency.

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Seventy miles an hour in a hydroplane. "Whip-po-Will, Jr." Commodore Judson's wonderful hydroplane, powered with a twelve cylinder Van Blerck engine, operating a 22 x 38" Columbian Ailsa Craig Propeller, created a new official record of 69.39 M.P.H. at standardized mile trials on Lake George. Best one-mile dash at 70.15 M.P.H.

Champion Toledo Priming Plugs

Sure Fire! **Chance Fire!**

Sure Start For Cold Motors

To sure-fire a cold motor, you must have gas right at the sparking point of the spark plug.

The one sure way to get it there is with Champion Priming Plugs.

The gasoline trickles right down the core and drips from the electrode—right where the spark jumps.

Don't take out your plugs—don't run down your battery or wear yourself out with useless cranking.

Put the gas where it will sure-fire.

Priming cups are better than nothing—they give you chance-fire conditions.

They let the gas in at a point too far away from the spark plug.

If the gas vaporizes sufficiently to travel over to the spark, well and good.

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And in a cold motor it does not readily vaporize.

The sure way is to put the gas at the spark-gap through Champion Priming Plugs.

Then you have a sure start for a cold motor.

Champion Priming Plugs are the best cold weather friends the dealer and garage man have. They have proven satisfactory for years and are free from the troubles that make the unproven substitutes now coming on the market unsatisfactory to both those who sell and those who buy them.

Champion Spark Plug Company, Toledo, Ohio

McQUAY-NORRIS
LEAK-PROOF
PISTON RINGS

The Piston Ring that Stands On Its Record —Not On a Promise

have seven years of successful performance records behind them. Seven years of trial and test. Seven years of steadily growing prestige with engineers and engine users founded upon what they've actually **done** in increasing motor engine efficiency and economy.

Performance alone has established McQuay-Norris LEAK-PROOF Piston Ring leadership; proved the merit of its exclusive design by which alone equal tension (the secret of maximum compression) is possible—its enduringly elastic material that insures long service—its wonderfully accurate workmanship that guarantees perfect fit.

Made in every size and over-size to fit every make and model of engine or motor. Quickly obtainable anywhere through your local dealer or garage. Over 300 jobbing and supply houses in all parts of the country carry complete size assortments. If you have any difficulty getting them—write us. We'll see you are supplied promptly.

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A special ring for the control of excess oil in oil pumping engines. Used with McQuay-Norris LEAK-PROOF Piston Rings for maximum compression, power and fuel economy.

Stays White Longer Keeps Clean Easier

Columbia Yacht White is a *permanent* white marine finish. You can wash its wear-resisting surface with soap and water.

It spreads so well you use less paint. Saves time and labor because it flows evenly and works freely under the brush. Its whitest whiteness defies salt water and hard knocks. No mid-season painting is needed. Next year its smooth, clean surface may be economically refinished. In lasting beauty Columbia Yacht White (semi-gloss) is a fair sample of all

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Vernosite, the long-life spar varnish, cannot turn white or lose gloss under sun, rain, snow, sleet or salt water.

Devoe Deck Paint outwears wear, water and weather. Stands extreme sun heat and will not crack, peel or chip. Eight durable colors.

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The only high speed boats that can go to sea and stay there.

If the phrase needs amplification write and we will explain.

After more than two years' experience, the least that can be said for a Sea Sled is that she can do everything that any other boat can do, and do it better than any other boat of her size and weight and power, and that she can do a great many things that no other boat of her size and power could attempt.

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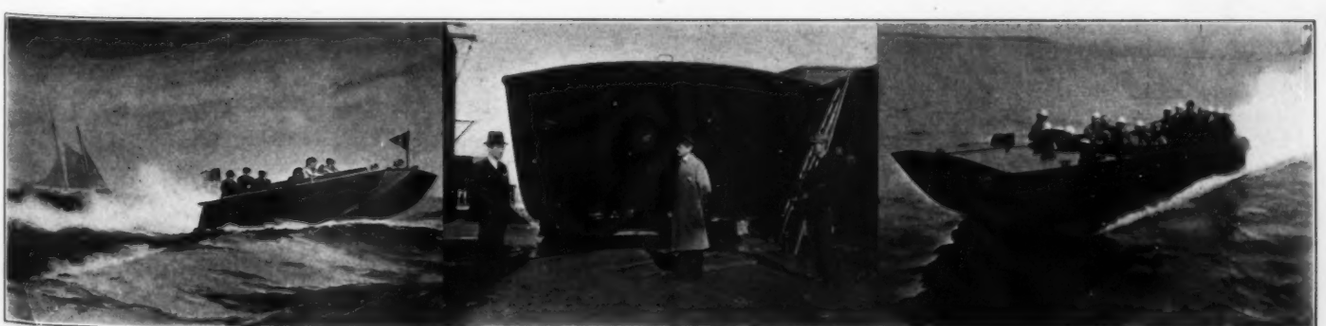
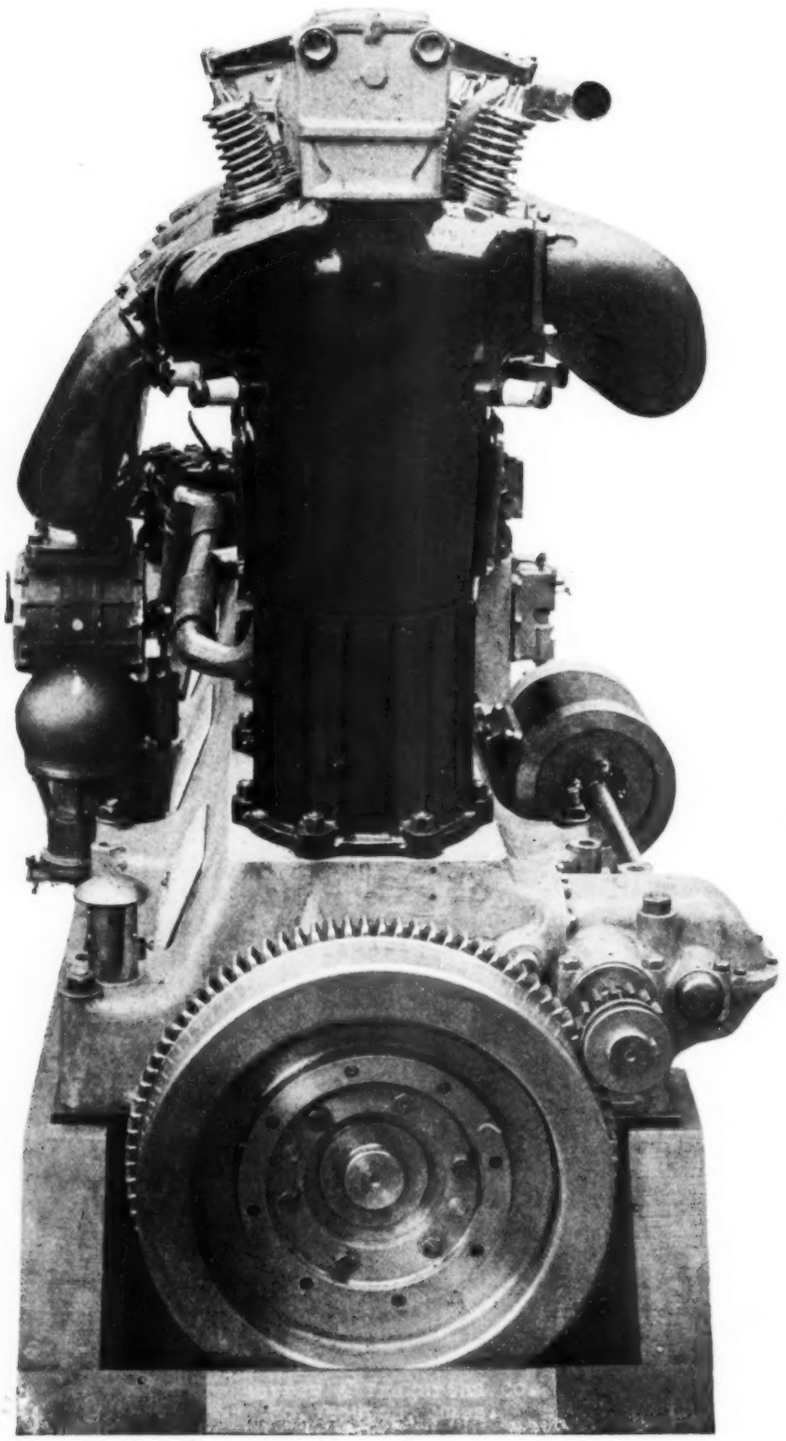


Murray & Tregurtha

300-400 Horse Power High Speed Marine Engine



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Type. Six cylinder, double valve-in-head. Overhead cam-shaft. Bore, 7¼ inches; stroke 9 inches.

Revolutions and Powe . 900 r.p.m. approx. 250 h.p.; 1100 r.p.m. approx. 330 h.p.; 1400 r.p.m. 400 h.p.

Crank Shaft. Seven bearing type, hollow, of special chrome nickel steel. Diameter, 3⅜ inches. Length of forward and intermediate main bearings, 4 inches. Length, after main bearing, 5¾ inches. Total length main bearings, 29¾ inches on a diameter of 3⅜ inches. Crank pin bearings: diameter 3⅜ inches, length 4 inches.

Lubrication. High pressure force feed type. Oil pressure in excess 50 pounds per square inch at 1400 r.p.m. carried on main bearings, crank bearings, and cam-shaft bearings, and direct to wrist pin bearings. Oil circulated through external cooler and showing temperature not in excess of 109° Fahr. during 4-hour run at 1250 r.p.m. full load.

Ignition. Four-point type. Two 2-point magnetos. Four spark plugs to each cylinder.

Governor. New positive type, with thermostatic safety device.

Carburetor. Special type with automatic hot air regulation and barrel throttle hung on ball bearings.

Electric Starter. Special type designed for this engine.

The engine is built to the highest standard of design, material and workmanship available and, so far as we are aware, has not been duplicated in any country.

Full Specifications and prices on request.

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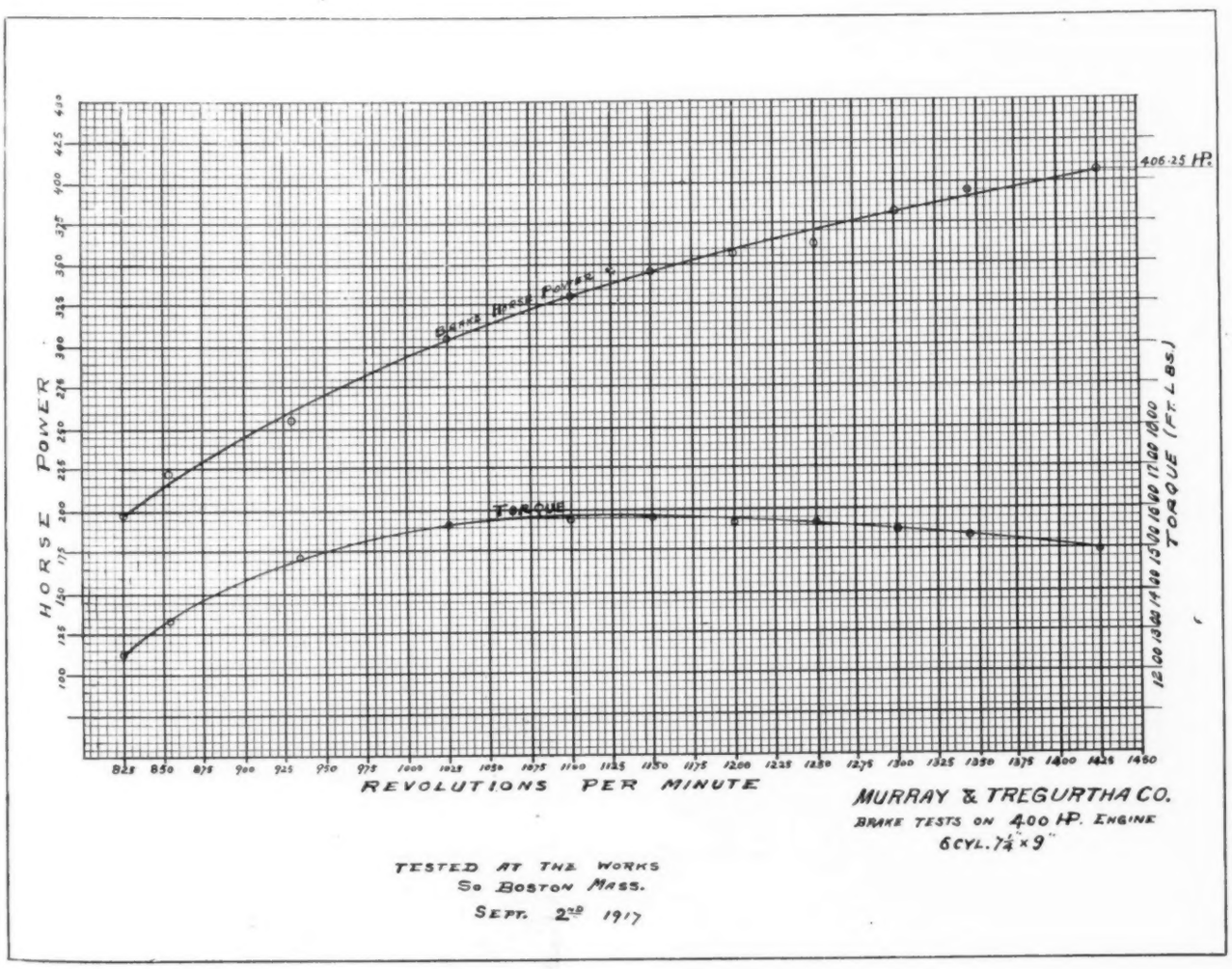

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New Safety—New Comfort

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2. Seaworthiness superior to that of any other type of boat, speed for speed and size for size, without exception. Can be driven at speed in a heavy following sea without possibility of tripping.

3. Greater freedom from pounding than in any other type, speed for speed, and length for length.

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5. Greater stability at all speeds than in other types of similar size.

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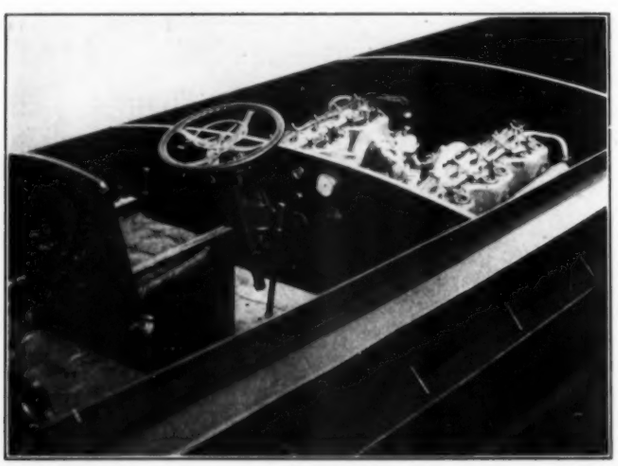

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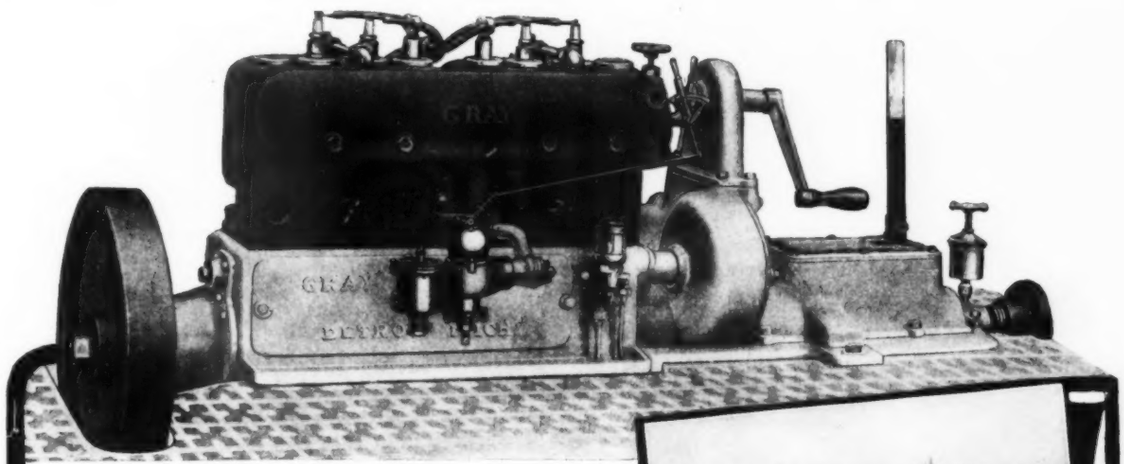
Largest Builders of Small Marine Motors in the World



Gray Model "D" 4-Cycle

THE ADAPTABLE ENGINE

Made good in every case. Semi Speed-boat, Work-boat, Cruiser and House-Boat.

Designed strictly for *marine* work—a real *marine* motor with all the marine features you have always wanted at a *moderate* price. Manufactured and backed up by an old established and responsible concern.

10-12 H. P. Model "D" 4-Cycle

Designed especially for fishing boats or any other boats where reliability, strength and endurance are the chief factors. Can be throttled down to slow speed.

GRAY TWO-CYCLES—Recognized all over the world as the standard two-cycle marine motor. Made in sizes 3 to 11 H.P.

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STANDARD THE WORLD OVER
3 to 40 Horse Power $74.00 Upwards

We have been in the Marine Engine business for twenty-one years. We constantly strive for universal efficiency and better motors and as a result Gray Marine Motors are Standard the World over.

SAVE MONEY—ORDER NOW AND AVOID DELAY NEXT SPRING

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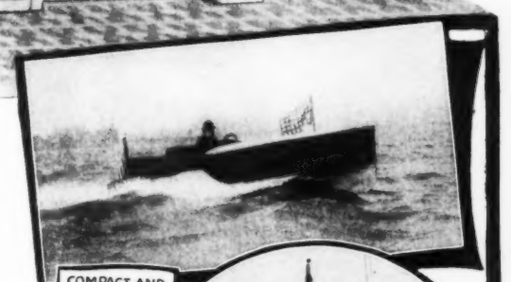
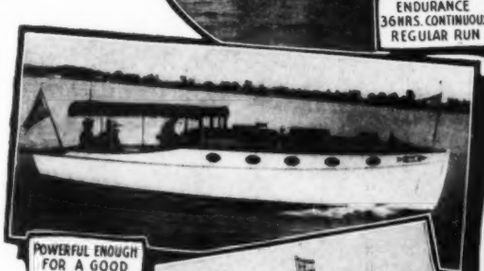


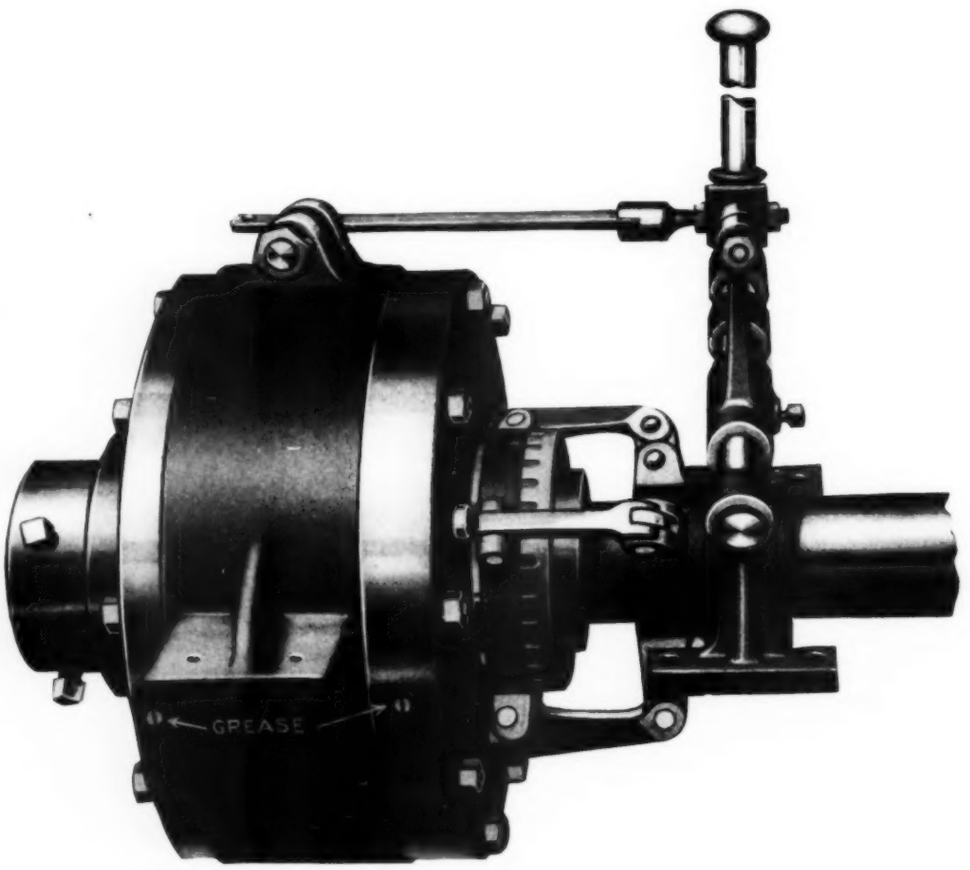


GRAY MARINE 2 STROKE & 4 STROKE MOTORS

REVERSE GEARS

for

WORK BOATS



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For YOUR boat

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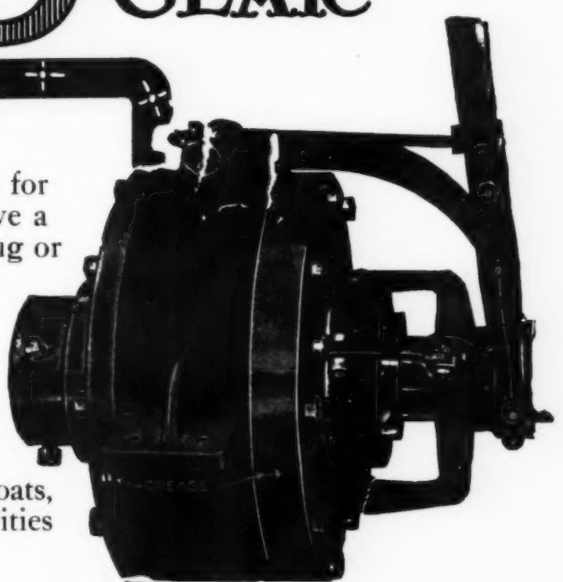

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Joe's Gears are known the world over. They are used in record breaking speed boats like Miss Detroit (shown below), Miss Minneapolis, and in passenger boats, commercial boats, auxiliaries, cruisers, etc. They excell in the qualities that make a good gear worth while.

Joe's Duplex Drive is the only heavy duty gear with nearly the same speed ahead and astern that does not depend on locked gear teeth for forward drive.

Write today for latest catalog. It contains valuable information you should have before you select any gear, clutch, or starter. It is free.

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JOE'S FAMOUS HIGH POWER GEARS.
For High and Medium Speed.

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Especially for Hydroplanes and High Speed Propositions; Smallest Size Transmits 30 H. P. at 1,000 R. P. M.

JOE'S REGULAR ONE-WAY CLUTCHES.
A high class, low priced clutch for general uses.

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A genuine safety device and a sure protection against kick back. Mounted either on adjustable frame or bulkhead bracket, and may be attached at either end of the motor. Saves labor, money and injury. Price reasonable.

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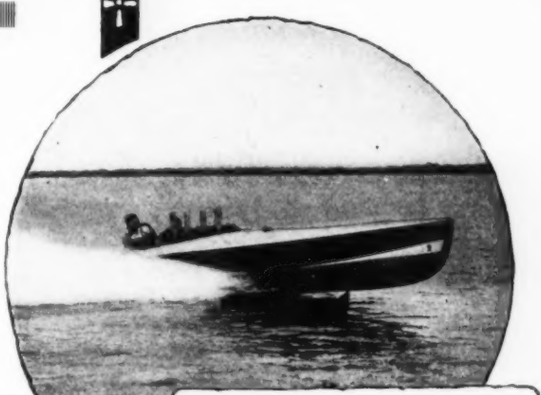


"Miss Detroit." Powered with a high-speed Sterling motor. Equipped with a Joe's Duplex Drive Gear.

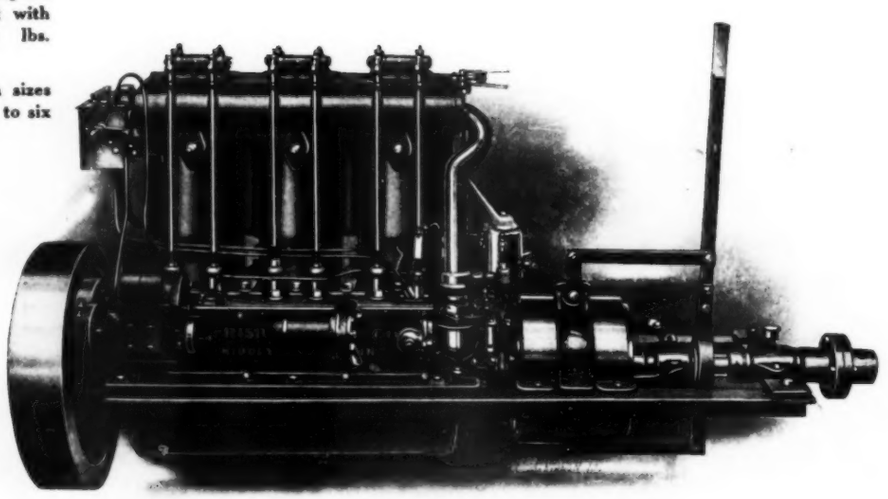
Frisbie VALVE-IN-HEAD MOTOR

Fris

Valve In Head Motor

Three Cylinder, 18-25 H. P. Bore 6", Stroke 6", Speed 400-550 R. P. M. Minimum Speed 150 R. P. M. Weight with Reverse Gear, 1050 lbs. Length, 65¾ in.

Other Frisbie motors in sizes from 3 to 75 H. P., one to six cylinders.



"The Friendly Motor"

Frisbie VALVE-IN-HEAD MOTOR

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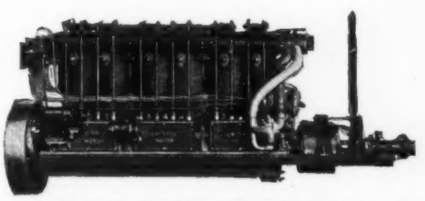
COME to the New York Motor Boat Show. Examine the Frisbie Motor while you are here. And don't fail to "visit" the Frisbie factory, through the medium of the moving pictures at MoToR BoatinG's exhibit.

We want you to know the Frisbie—the "friendly' motor. We would like to entertain you at our factory and take you on a cruise in a Frisbie powered boat. We wish you could meet some of the hundreds of enthusiastic Frisbie owners who are the best friends—and the best salesmen —we have.



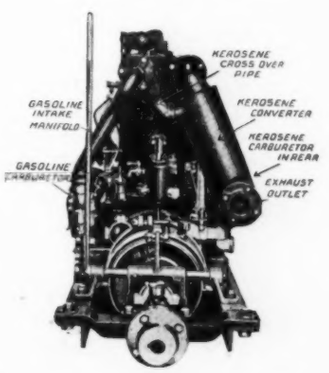
Six-Cylinder Frisbie. 50-75 H. P. 6 in. x 6 in. Speed 550-800 R. P. M. Weight, engine and reverse gear, 1600 lbs. Length over all with reverse gear 88½ in.

The Frisbie is a high grade medium speed engine, designed to operate hour after hour with the utmost economy and reliability. It is intended for comfortable cruisers and for important work boats. It is the most reliable power plant you can install. Equipped for either gasoline or kerosene.

Sooner or later you will be in the market for just such a motor as the Frisbie. When that time comes you'll wish you had taken advantage of the opportunity to study this motor at first hand.

So don't fail to see the Frisbie at the Show. In Block E, Main Floor.

Write today for latest catalog and prices

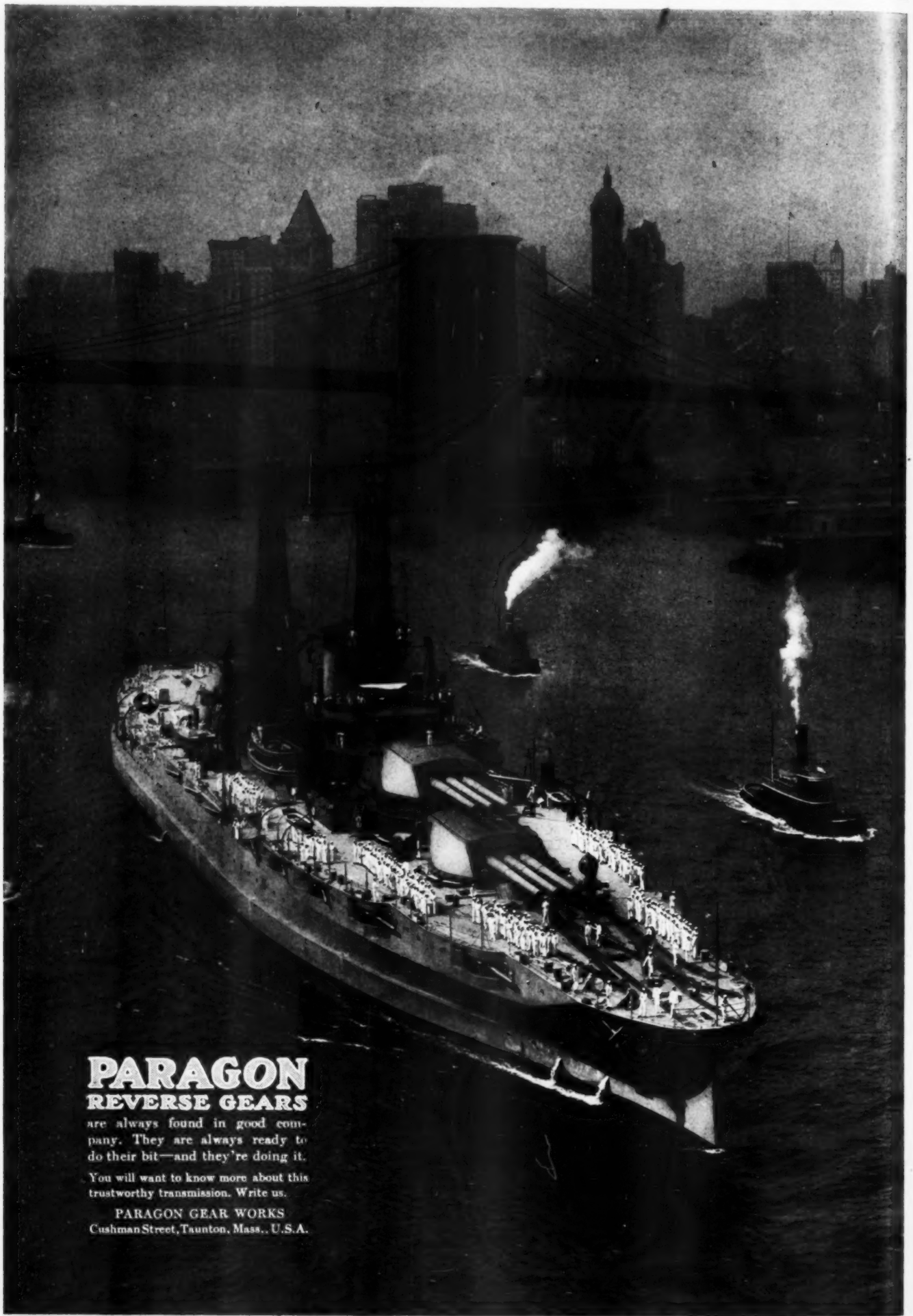


FRISBIE KEROSENE MOTOR

Three-Cylinder, 18-25 H. P., 6 x 6 inch bore and stroke. End view of Frisbie Kerosene Motor, showing the separate manifolds and carburetors on opposite sides. The Frisbie Kerosene equipment is a thorough success. We have operated the machinery of our plant on one of our kerosene motors for several years. It supplies the cheapest and most dependable power we could desire.

The Frisbie Motor Company

7 College Street, Middletown, Conn.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REVERSE GEARS
are always found in good company. They are always ready to do their bit—and they're doing it.
You will want to know more about this trustworthy transmission. Write us.
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U. S. S. Pennsylvania, underneath Brooklyn Bridge, New York

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PARAGON
REVERSE GEARS

desire to extend to the engine builders of America—and to individual motor boat owners—best wishes for the New Year and sincere appreciation of their unprecedented demands for Paragons during 1917.

We regret that on account of the many requisitions for Paragon equipment on America's finest motors—and the Government-built engines

in the U. S. Navy

many of our good friends were obliged to use substitutes.

We are making every effort to guard against any Paragon user being disappointed in 1918 and respectfully ask co-operation in the placing of orders for Paragons a little further ahead than is necessary under normal conditions.

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Evans Stamping & Plating Company
Cushman St. Taunton, Mass.

See the Paragon Movie—at the Motor Boat Show

How Much Is

Your life, your soldier-friend's life, any life, is worth more than any sum you can say in mere money. It cannot be replaced. So do not let it be lost. Whenever you are at sea,—whether in your own motor boat or on a transatlantic voyage,—you need an

Ready for any emergency

Ever-Warm

The Ever-Warm Safety-Suit ensures 100% Safety at Sea. *You cannot drown, you cannot chill,* when you are protected by one of these suits. Conscious or unconscious, strong or weak, you will be kept afloat and safe—*dry, warm* and comfortable—for hours or even for days if necessary, until help arrives.

These suits are now carried by passengers on practically every liner and transport on the Atlantic today. Soldiers, sailors, doctors, nurses, diplomats, and many others are using them. Dr. George E. Brewer of the Presbyterian Hospital Unit says: "I regard the Ever-Warm Safety-Suit as 90% life insurance. The nurses and doctors ready to sacrifice their lives on the other side are entitled to this protection."

The Ever-Warm Safety-Suit gets its buoyancy not from air, but from a special composition which has five times the buoyancy of cork. It enables the wearer to *support at least five other persons* afloat indefinitely. Its buoyancy is indestructible —even if the suit be punctured, torn or cut, you cannot drown. The suit can be *put on in less than a minute.*

International Life

Sole Agents and Distributors

11 Broadway, New York City

10th Floor Phones: Bowling Green 8609 and 8775

Officers and Soldiers at a U. S. army cantonment trying their Ever-Warm Safety-Suits before sailing for "Somewhere in France".

YOUR Life Worth?

Every soldier or civilian who crosses the ocean during this war should be protected by an infallible life preserver. The dangers of the submarine zone, the ever present perils of ocean travel, especially in winter, are too great to be even a fair risk. Therefore every man who values his life more than money should provide his own

Safety-Suit

Protection Against Exposure Also

In this weather a half hour's exposure in the open ocean would mean almost certain death. It is a fact that in many of the great sea disasters, more persons have died from exposure than by drowning. The Ever-Warm Safety-Suit is the only life preserver which protects from exposure as well as drowning. It is a human thermos bottle, keeping the cold out and the bodily warmth in.

Following is part of the report of Capt. H. F. Long, of the S. S. "Prinz Eitel Friederick" to the Marine Superintendent of the U. S. Shipping Board, after a test of the Ever-Warm Safety-Suit.

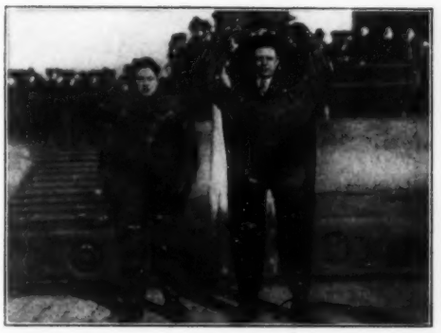
"I donned the suit in fifty-five seconds—being totally unfamiliar with it—and jumped overboard. Was completely immersed, and paddled around for about five minutes. I found the suit very comfortable while in the water. I tried it in different positions that a person might be in if unconscious, and found that I floated perfectly upright at all times. My shoulders were ten inches out of the water. On removing suit I found myself to be perfectly dry. In my opinion the Ever-Warm Safety-Suit is a wonderful invention."

Order your suit as early as possible. The demand is tremendous. Write today for prices.

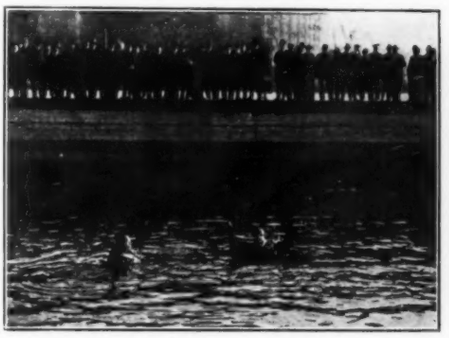
Be sure to see the Ever-Warm Safety-Suit at the Motor Boat Show.

Territorial Agencies Can Be Contracted For.

Suit Corporation



Ready for a plunge in the cold water of New York Harbor, December, 1917.



Ever-Warm Safety-Suit wearers dry, warm, comfortable and safe while the spectators in furs and overcoats are not so comfortable on shore. New York Harbor, December, 1917.

After their plunge, the soldiers' uniforms were as dry and fresh as before their immersion.

Albany BOATS

Albany Standardized Boats

The Albany Boat Corporation believes in efficient manufacturing methods, in definite manufacturing schedules, so have concentrated their output, in the main factory buildings, to the following types of Standardized Boats. By so doing it has been possible to materially increase total production; produce better boats; make much better deliveries.

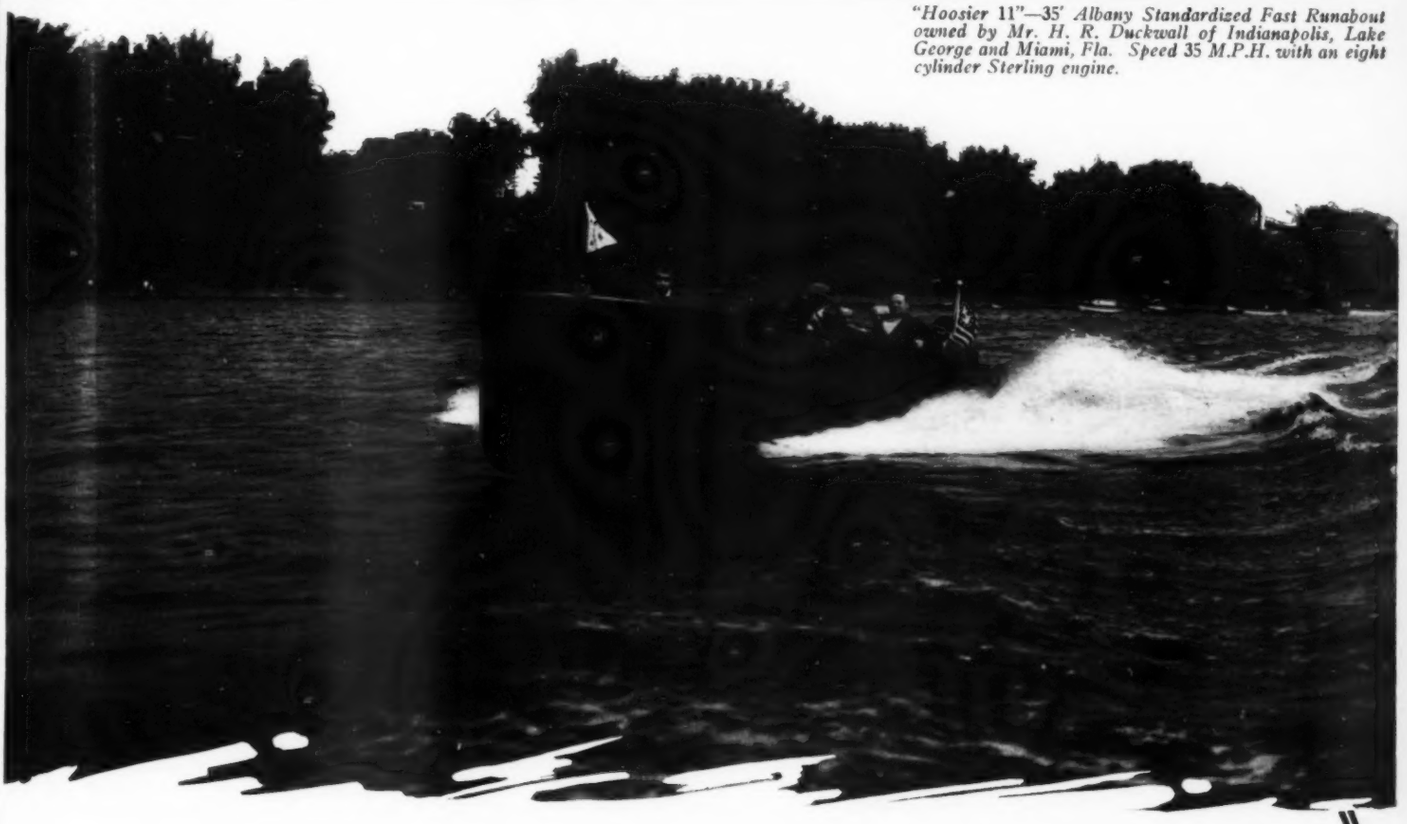
Fifty Foot Express Cruiser, speed 18 to 30 miles an hour
Forty Foot Express Cruiser, speed 18 to 35 miles an hour
Thirty-Five Foot Open Runabout, speed 27 to 35 miles an hour
Thirty-Five Foot Sedan Runabout, speed 27 to 35 miles an hour
Twenty-Six Foot Open Runabout, speed 20 to 23 miles an hour

The speed mentioned for each boat is entirely dependent on the amount of power installed. Full details will gladly be supplied on each one of these boats, giving the speeds obtainable with various engines, etc.

A booklet has also been prepared on each of these boats and you will find them of exceptional interest, as they are well illustrated and the boats are described in detail. Write to-day for the book describing the particular boat in which you are most keenly interested.

ALBANY BOAT CORPORATION, Watervliet, N.Y.

"Scout"—50' Albany Standardized Express Cruiser. Speed 25.57 M.P.H. at her trials. Pair eight cylinder Van Blerck engines as the power. Owned by United States Government.



"Hoosier 11"—35' Albany Standardized Fast Runabout owned by Mr. H. R. Duckwall of Indianapolis, Lake George and Miami, Fla. Speed 35 M.P.H. with an eight cylinder Sterling engine.

Albany boats have, through years of constant endeavor, become noted for their handsome appearance, seaworthiness, speed and all-round efficiency. There is a distinct "pride of ownership" in the possession of an Albany Boat. Hereunder is a partial list of the more recent purchasers of Albany Boats.

Mr. Vincent Astor	New York City	Mr. L. G. Schrieber	Cincinnati, O.
Mr. W. S. Hobart	San Mateo, Calif.	Mr. Wm. L. Rich	New York City
Mr. W. K. Bixby	St. Louis, Mo.	Mr. W. R. Simons	New York City
Mr. H. R. Duckwall	Indianapolis, Ind.	Miss Gertrude Allen	New Rochelle, N. Y.
Mr. A. B. Quarrier	New York City	Mr. Chas. Deering	Miami, Fla.
Mr. Ed. L. Welsh	Philadelphia, Pa.	Mr. Hugh Matheson	Miami, Fla.
Mr. Jos. McAleenan	New York City	Mrs. Geo. P. Hilton	Saugerties, N. Y.
Mr. Geo. B. Van Cleve	New York City	Mr. Ed. L. Romph	Miami, Fla.
Mr. Russell Lord	Chicago, Ill.	Mr. R. E. Henry	New York City
Mr. W. E. Ogilvie	Havana, Cuba	Mr. Allen Blakewell	Boston, Mass.
Dr. J. D. McKenney	Rochester, N. Y.	Mr. Philip Smith	New York City
Mr. James K. Hackett	New York City	Mr. Ross D. Thompson	Washington, D. C.
Mr. W. N. Andrews	Newport, Ky.	Mr. Joseph Wittman	New York City
Mr. C. J. Harrah	Havana, Cuba	Mr. George L. Howard	Malone, N. Y.
Mr. Wm. U. Becker	Brooklyn, N. Y.	Mr. E. R. Thomas	Palm Beach, Fla.
Mr. W. M. Griffin	Fort Wayne, Ind.	Miss Helen Jones	Honolulu
Mr. DeWitt Veeder	Schenectady, N. Y.	Mr. J. R. Roosevelt	New York City
Mr. Payne Whitney	New York City	Mr. W. E. McCaw	Cincinnati, O.
Mr. Martin H. Sullivan	Montgomery, Ala.	Mr. A. W. Church	Port Chester, N. Y.
Mr. F. F. Peabody	Troy, N. Y.	U. S. Government	

Albany Boats are in service North, South, East and West. Wherever you find one there you also find a satisfied owner who is more than proud of his outfit. You will also probably find that that particular boat is the fastest boat in the vicinity. Albany Boats have a habit of going a little faster than anything else around them.

ALBANY BOAT CORPORATION, Watervliet, N. Y.

Use Business Methods In Buying Your Boat Engine

Get this book and learn all about Power Boat Engines

Bristling with valuable suggestions and interesting information this book contains the very essence of what you must know to buy your boat engine intelligently.

The book describes and pictures the complete line of ***L-A*** engines for launches, cruisers, work-boats, etc. It gives you comprehensive knowledge of the size and power engine for your boat. And it offers timely advice to aid you in your selection.

If you plan purchasing an engine, or can use this book merely for comparative purposes, send for it at once. Clip and mail the coupon below—now!

MARINE L-A ENGINES

Inboard and Outboard — ***2 & 4 Cycle—2 to 20 H.P.***

There's an ***L-A*** Engine for every size boat.

Ranging from the portable 1 cylinder, 2 h.p. outboard engine to the big 4 cylinder, 20 h.p. inboard motor, the ***L-A*** line is complete and embodies throughout the same fine workmanship and skillful engineering.

Built to an ideal of simplicity, strength and durability ***L-A*** Engines have stood the test of years.

They are beautifully clean and compact in their lines, easy to understand and readily accessible in all parts. They accurately meet the requirements of the man who demands a thoroughly dependable power plant for pleasure or work boat. Five well-known engineers selected ***L-A*** engines because they proved ***L-A*** superior ability.

The 30 Days' Trial Plan gives you a generous opportunity to determine ***L-A*** performance before you decide.

LOCKWOOD-ASH MOTOR CO.

1801 Horton Avenue—Jackson, Michigan

Liberty Bonds—$102 for every $100 bond; $51 for every $50 bond—will be accepted in part or full payment for *L-A* motors.

Lockwood-Ash Motor Co.
1801 Horton Avenue
Jackson, Michigan

Please mail me a copy of your book that will give me information on the construction and operation of marine motors.

(Name) _____

(Street No.) _____

City and State) _____

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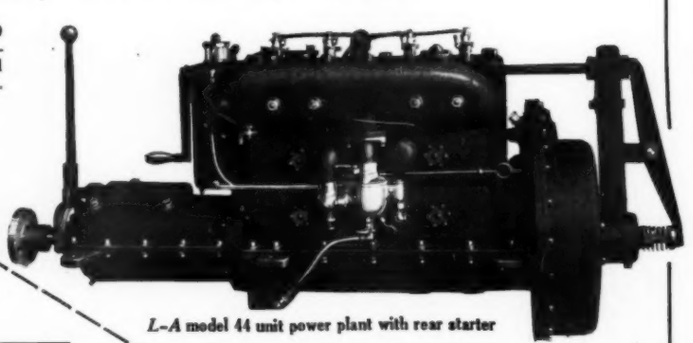
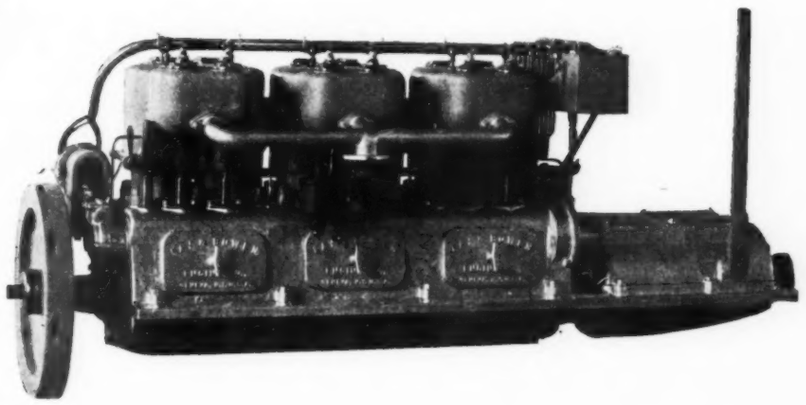


***L-A* model 44 unit power plant with rear starter**



Fay & Bowen Engines—A Source of Constant Satisfaction, Always

BUILT to give reliable service **always** and **all ways**, the FAY & BOWEN ENGINES meet every reasonable demand without delay or complaint, and may be depended upon to render this kind of service year after year. We are prepared to convince you thoroughly before we ask you to purchase. Write for descriptive literature and mention your requirements.

FAY & BOWEN ENGINE COMPANY

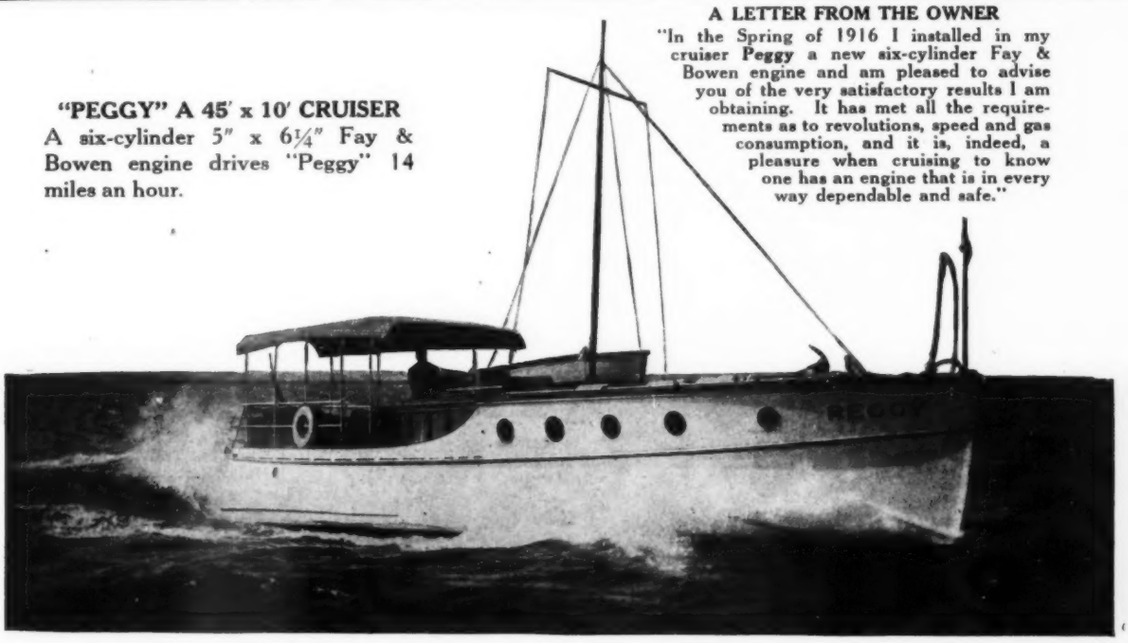
104 LAKE STREET, GENEVA, N. Y., U. S. A.

Four-cycle Engines,
Two-cycle Engines,
Finished Motor Boats,
Electric Lighting Units,
And Pumping Sets.

NEW YORK: 50 Church St., on Concourse, Sutter Bros., Representatives.
Built for Canada by ST. LAWRENCE ENGINE CO., LTD., BROCKVILLE, ONT.

"PEGGY" A 45' x 10' CRUISER
A six-cylinder 5" x 6¼" Fay & Bowen engine drives "Peggy" 14 miles an hour.

A LETTER FROM THE OWNER
"In the Spring of 1916 I installed in my cruiser **Peggy** a new six-cylinder Fay & Bowen engine and am pleased to advise you of the very satisfactory results I am obtaining. It has met all the requirements as to revolutions, speed and gas consumption, and it is, indeed, a pleasure when cruising to know one has an engine that is in every way dependable and safe."



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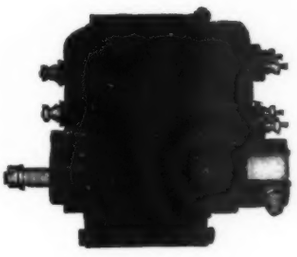
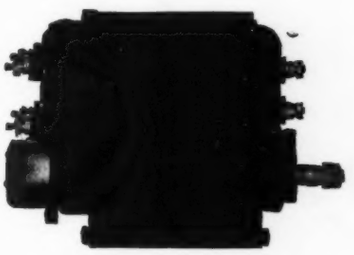


MODEL L MAGNETO

Used extensively on automobile, marine, stationary and tractor engines. Designed especially for engines having a normal speed of 500 or more revolutions per minute.

High Tension Magnetos, Low Tension Magnetos, Make-and-Break Coils, Dash Coils, Box Coils, Motorcycle Coils, Switches, Spark Plugs, Cable, Etc., Etc., Etc.



MODEL L-3 MAGNETO

Similar to model L in construction except that it is much larger. Three magnets are used and the armature is larger and stronger. Intended for use on large, slow running engines whose normal speed is under 500 revolutions per minute.

PERFECTED by years of study and experiment to give the satisfaction that only standard appliances can give. From first to last Kingston devices are made for service.

They are simple, reliable, inexpensive and durable. Kingston coils and plugs are used by hundreds of manufacturers of stationary and marine engines and automobiles throughout the world.

MODEL M MAGNETO

Similar to Model L in construction, except that it has no distributor and is used on one-cylinder engines and on double cylinder engines firing at 180 degrees.

If you are not among the list it will pay to investigate.

If you want to know how Kingston devices are made, what they have done for others and what they will do for you, write for complete information.

KINGSTON STANDARD 4-CYL. DASH COIL WITH SWITCH

KINGSTON MICA PLUG

KOKOMO ELECTRIC CO.

KOKOMO, INDIANA, U. S. A.

LARGEST MANUFACTURER OF SPARK COILS IN THE WORLD

New York: 1733 Broadway **Chicago, Ill.: 1430 Michigan Ave.**
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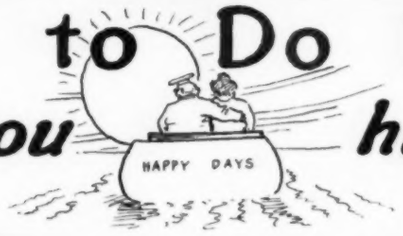
Nothing to Do But Ride

if you 

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KERMATH

And Nothing to Do But Sell If You Represent the Kermath

The Kermath is as nearly a "self-selling" engine as anything on the market today. It is an engine of steady demand—well known and well liked. It is a standardized product, almost a staple.

Kermath Engines are bought by owners of launches, cruisers and commercial boats in every part of the world. They are regularly installed by successful boat builders in their stock models and in special built-to-order boats. You take no chances when you buy a Kermath—you simply enlist in the already large army of satisfied Kermath users.

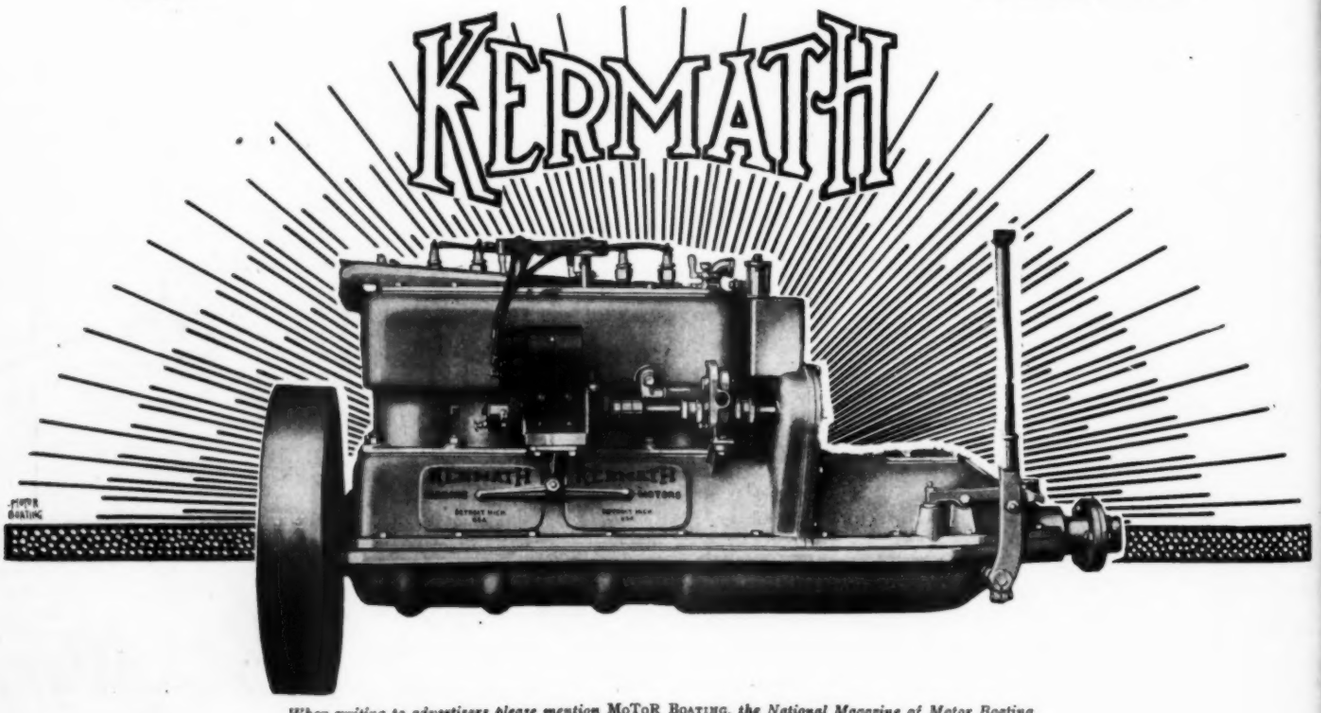
See the Kermath exhibit at the Motor Boat Show, Grand Central Palace, New York, from January 19th to 26th. See why it is so popular. Examine it carefully and take advantage of the opportunity to compare it in both construction and price with the other marine engines exhibited.

IMMEDIATE DELIVERIES ON ALL MODELS

Dealers: We urge you to get the details of our selling proposition during the Show. Don't fail to see us.

Kermath Manufacturing Company

Dept. 2 **Detroit, Mich.**



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